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ABSTRACT

This handbook guides college and university business officers, from small liberal arts colleges to community colleges to research universities, through the complex set of decisions and actions associated with replacing financial management systems. It lists the steps necessary to evaluate an institution's current hardware, network, and software; and identifies change strategies for both incremental and large-scale financial system changes. An introductory chapter sets out the issues that have altered the context of financial systems planning. The second chapter discusses vision, planning principles, goals and strategies, and the development of a decision framework. Chapter 3 covers the structure and management of the project; Chapter 4 covers the business and technology requirements. Reviewing alternative strategies, issuing the request for proposal, developing an evaluation and measurement system, and presenting recommendations to the steering committee are among the topics covered in the fifth chapter. The final chapter discusses implementation of the system. Seven appendixes include: a list of planning principles relating the use of information technology to the solution of business problems; a glossary of terms and concepts; components of a typical request for proposal; sample vendor evaluation criteria; two model measurement systems; a list of available corporate products and services; and a reading list. Biographical and sponsor profiles are also appended. (Contains approximately 165 references.) (CH)

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Campus Financial Systems for the Future

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by Stephen Jonas, Richard N. Katz, Linda Martinson,
Margaret F. Plympton, Steven W. Relyea,
Edwin D. Rennie, Julia A. Rudy, and John F. "Barry" Walsh

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Foreword

The process of planning and implementing a financial management system is a complex one, with numerous participants, myriad considerations to address, and long-term implications. Colleges and universities must meet the challenges of increased performance accountability, cost containment, and higher productivity. We are pleased to be able to offer this handbook as a guide to help chief executive officers and other executive decision-makers navigate through the decisions as well as the planning and implementation process itself.

Among the many helpful recommendations of this handbook, two are worth emphasizing here. First, there is no single formula that can lead to success. This handbook stresses the importance of devising the most appropriate strategy for meeting your institution's unique and specific needs.

Second, meeting the challenges successfully requires a strategy based on teamwork and partnership – which are much more often applauded in theory than observed in practice. Our culture's popular arts don't celebrate the "glamour" of collaboration, let alone its necessity. At every step in the development of this project, and in the product itself, we have sought to emphasize the need for real and continuing partnerships. Effective use of this handbook also requires a partnership between financial executives and information resources management executives.

NACUBO and CAUSE are grateful to the authors for this thorough, valuable contribution to the field of higher education management. We believe this handbook can be an indispensable tool for both veteran and newly appointed financial officers and information technology managers in understanding the process and grappling with the challenges of making financial management decisions for the future. A noteworthy attribute of this handbook is the applicability of the process described herein to *any* type of system implementation, financial or otherwise.

Given the increasing complexity of the rapidly changing technology landscape, NACUBO and CAUSE look forward to continued work as partners to provide additional information and assistance to enable our institutions' leaders to craft the best possible decisions, informed by the thinking of some of the best minds in our collective communities.

James E. Morley Jr.	Jane N. Ryland
President	President
NACUBO	CAUSE

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This project originated with the NACUBO Financial Information Systems Subcommittee, whose members brought focus to the need for such a handbook. The members of this committee include David C. Bosserman (chair), Oklahoma State University; Lauren J. Brisky, Vanderbilt University; Weldon E. Ihrig, Oregon State System of Higher Education; Robin E. Jenkins, NACUBO; Louis H. Katz, George Washington University; Louis G. Marcoccia, Syracuse University; Linda Martinson, The Galloway School; and Steven W. Relyea, University of California, San Diego. Their steadfast and enlightened guidance throughout the development of this book was invaluable.

NACUBO and CAUSE gratefully acknowledge the authors who took on much more than they bargained for, both in terms of the volume and depth of this endeavor as well as the time commitment. Their commitment to this important effort and the value of their considerable expertise cannot be overstated. In particular, were it not for the editorial leadership of Julia A. Rudy of CAUSE, this book would not exist. With the diplomatic skills of a peace negotiator, she kept seven busy and opinionated colleagues on track and demanded more of everyone than they thought they had to give. A tremendous amount of credit is due her.

A debt of gratitude is owed to the many administrators who provided ideas and constructive criticism, which helped to refine the process described herein and enhanced this book's usefulness. These include Robin Beck, University of Pennsylvania; Kenneth C. Blythe, Pennsylvania State University; Barbara D. Green, San Jose State University; Janet S. Gordon, University of Pennsylvania; Kenneth J. LaSalle, Lansing Community College; Michael J. Marinaccio, Minet; and Richard P. West, The California State University System.

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Finally, the book's development and publication was made possible by the generous sponsorship of Andersen Consulting and PeopleSoft, Inc. (see pages 116-117). Their support and belief in the value of this project are greatly appreciated.

Preface

In April 1993, the National Association of College and University Business Officers formed the Financial Information Systems Subcommittee. The members of this group observed that many colleges and universities were in the midst of or considering the acquisition or development of new financial systems.

The subcommittee's discussions noted that at least five fundamental changes in the basic character and nature of information technology were likely to influence, in important ways, the manner in which new financial systems should be evaluated, selected, and developed or purchased. These changes include: (1) the increasing roles of campus networks and the Internet; (2) the emergence of distributed hardware and software platforms; (3) the emergence of graphical user interfaces; (4) the emergence of new information distribution and access approaches (e.g., World Wide Web) and new tools for information analysis and decision support; and (5) the increasing viability of robust electronic commerce.

Against this technological backdrop, the subcommittee also observed that fundamental changes in the administrative operations of many U.S. colleges and universities were taking place. The first half of this decade has witnessed increasing public skepticism, declining enrollments in many geographic areas, and sharp declines in state support for many public universities. Additionally, current pressures to reduce the federal deficit suggest that the late 1990s will witness broad reductions in federal support of higher education, particularly of university-based research. Finally, the subcommittee noted that a few colleges and universities were experimenting with the financial system planning, selection, and implementation process itself, exploring new partnerships with software vendors and other colleges and universities.

These observations led subcommittee members to conclude that an important need would be filled by commissioning a practitioner's handbook to help guide college and university business officers through the complex set of decisions and actions associated with replacing financial management systems.

To fill this need, NACUBO asked several leaders in college and university management to "develop a publication that addresses, in a 'how-to' format, the steps necessary to evaluate an institution's current hardware, network, and software." As authors of this book, we were asked, further, to identify change strategies that would support both incremental changes in financial systems and large scale changes in the institution's "financial architecture." Finally, we were asked to identify themes, messages, and strategies that would assist campus practitioners across the entire higher education constellation, from small liberal arts college to community college to research university.

Most importantly, an early decision was made to produce this book as a collaboration between NACUBO and CAUSE, the association for managing and using information resources in higher education. This collaboration reflects our universal belief that the successful implementation of new financial information systems depends on a strong and healthy partnership between financial management and information technology management.

Our group of authors reflects broad and varied experience and expertise in financial and technology management. We are technologists, financial officers, planners, and generalists, who brought to the writing experience rich and varied professional backgrounds representing a broad spectrum of perspectives — from liberal arts to community college, from public research university to the Ivy League, and from an international association.

We sincerely hope that the book we have developed reflects the benefits of this professional and contextual diversity and reflects the mutual learning (without the occasional learning pain!) that we have shared in this writing experience.

Stephen Jonas
Richard N. Katz
Linda Martinson
Margaret F. Plympton
Steven W. Relyea
Edwin D. Rennie
Julia A. Rudy
John F. "Barry" Walsh

Chapter I
Overview

- **Understanding the Context**
- **To Thine Own Self Be True: Financial Systems and Practices**
- **New Technology and the Need to Rethink Project Roles**
- **New Options for the '90s — Partnering**
- **Emphasis on People and Process**

"In the 1990s and beyond, the pervasiveness of an institution's financial system — and its interconnection with other key systems and the campuswide network — highlight more than ever the need to integrate thinking about the institution's financial management model with its academic vision, strategy, and delivery system."

I: Introduction

In addition to the major changes that are occurring in the technology environment, college and university leaders charged with planning and implementing financial management systems for the future must also contend with a number of changes affecting higher education administration in the '90s.

Understanding the Context

At least five issues are altering dramatically the context for financial systems planning: (1) calls for increased accountability in higher education; (2) a changing environment that will demand flexible new systems; (3) increasing pressures for efficiency and productivity in colleges and universities; (4) the mandate for improved service quality in higher education; and (5) the importance of involving the broad campus community in the planning process.

Accountability

Increasing public skepticism of higher education has manifested itself, in part, in calls for increased accountability and academic effectiveness. These calls have, in turn, found expression in the creation of myriad new financial accounting and reporting requirements. In general, these new requirements call for more information, more frequent reporting, more conformance with generally accepted accounting practices (GAAP), and more disclosure of budgetary as well as expenditure information. The demands that these requirements are placing on most of higher education's installed base of financial information systems were not anticipated by the designers of those systems.

Flexibility

Flexible financial systems should also be capable of providing an appropriate level of integration with associated systems. For example, as institutions look forward to the redesign of the accounts receivable processes, they will likely want integration between the financial system and components of their student system — such as financial aid, housing, and registration. There also will be a desire to provide the necessary flexibility to integrate the financial system with ancillary or feeder systems such as the storehouse, bookstore, or telecommunications billing systems. Such integration will improve the timeliness of information being fed into the financial system.

At an early stage in the project, the institution should determine how this integration will take place, e.g., whether it is cost effective to develop or acquire new student and human resources systems concurrently with, or as a part of, a new financial system project. This decision should depend not only on the desirability of such integration, but on the institution's ability to manage effectively the increased project scope and complexity that such a decision would bring about.

While every college or university should be prepared to address the question of how broad the scope of the system project should be, this book focuses on the issues surrounding financial systems. The process outlined, however, can also be used by institutions that wish to plan for and implement a set of integrated systems.

Integration comes at a price. Integrated systems tend to be much more complex than modular systems and, therefore, demand more resources to design, develop, and support. This added complexity may also make it more difficult to migrate highly integrated and customized systems to evolving technology architectures in the future.

Efficiency and productivity

Calls for increased efficiency have found expression in a variety of changes in many college and university business and finance programs and practices. Such changes include organizational restructurings, early retirement programs, quality improvement programs, program curtailments, and reengineering efforts. These changes have also added urgency to higher education's look at its underlying financial information systems. On many campuses, early retirements and other staff reductions have depleted the staff talent pool. In cases where senior employees have not been replaced — while campus financial activity has remained constant or increased — many college and university business officers face higher risks of transaction error or internal control failures.

In other cases, efforts to redesign business and financial processes have been constrained by existing financial systems that have automated old vertical functions, such as purchasing and disbursements, and that cannot deliver the desired institutional efficiencies without wholesale redesign or replacement. In all cases, the pressures for increased efficiency are fueling institutional needs for more and better information, both to monitor and control budgets and expenditures and to plan and forecast financial activity. The satisfaction of these needs, too, is being constrained and limited by existing financial systems.

Service quality

Calls for increased client service have found expression not only in a wide variety of plans, strategies, and programs to enhance the quality of teaching and research, but also in a similarly rich variety of business and finance activities designed to enhance the service quality of higher education administration. The programs include the implementation of integrated voice response (IVR) systems for registration or benefit enrollments; electronic deposit for employee paychecks and vendor payments; the implementation of all-in-one cards to support student and faculty access to campus services; the deployment of Internet "home page" directories of campus services; and many others. These pressures, too, fuel increasing expectations of the institution's financial services and the systems that support these services.

Inclusiveness

Given the collegial aspects of higher education governance, success in any major college or university project depends on multilateral participation with faculty, students, and other key stakeholders. In many ways, the unique impulse in higher education to consult broadly, to engage in critical exchange, and to respect diverse opinions is the wellspring of our industry's ability to renew itself continually.

This same impulse is also a potential source of contention, project delays, fragmented decision-making, and project overhead which can put such projects at risk, as well as serve as a continual source of consternation to our industrial business partners. While achieving an effective balance between broad-based, institution-wide consultation, collaboration, and communication and tight project control is more art than science, the need to do so is discussed explicitly and is a current that runs throughout this book.

To Thine Own Self Be True: Financial Systems and Practices

If indeed there can be a universal prescription that applies equally to all elements of higher education, it is that one must not divorce the financial system from the intended institutional financial management model. This notion is analogous, but not identical, to the process of defining requirements that is an accepted component of the structured analysis used to specify the financial systems of the 1970s. In the 1990s and beyond, the pervasiveness of an institution's financial system — and its interconnection with other key systems and the campuswide network — highlight more than ever the need to integrate thinking about the institution's financial management model with its academic vision, strategy, and delivery system. For example, a multisite, instruction-oriented institution that focuses on part-time degree seekers — such as the University of Phoenix — will organize its financial environment and systems differently from, for example, a university with a medical center and large auxiliary enterprises or a small private college with a predominantly residential student body.

The process of reconciling the high-level design and architecture of the financial system with the academic and business model of the institution is made more challenging by the dynamic nature of higher education in the 1990s. The external forces shaping today's decision-making context are creating a set of options that could not have been considered — on technical grounds alone — 25 years ago. Today's decision-maker has a range of options that is at once gratifying and potentially overwhelming, and, more important, a cast of stakeholders that is diverse, interested, computer literate, and influential. This is a good news-bad news story.

In the 1970s, financial transactions and financial analysis depended on the same system. Large campus financial systems demanded mainframes and/or minicomputers, and design decisions were often based on factors related to computing resource availability and software maintainability. For these reasons, these systems, in spite of frequent protestations to the contrary, typically drove our financial practices and operations, rather than the other way around. The introduction of the personal computer, dramatic improvements in computing price/performance, growth of campuswide networks, and progress in distributed computing architectures have changed all of this.

The good news is that colleges and universities now have much greater freedom — financially and technically — to reinvent their financial practices. Many institutions are doing so. The University of Pennsylvania, Indiana University, University of Southern California, UCLA, Cornell University, and other large research universities have moved or are moving toward responsibility center management, a distributed financial accountability model that depends on distributed financial information.

College and university trustees, bond underwriters, bankers, and public officials are seeking, for different reasons, to provide meaningful financial comparisons among institutions of higher learning, creating tensions between the traditional fund-oriented reporting model of the Governmental Accounting Standards Board (GASB) and the entity-oriented model required under the Financial Accounting Standards Board (FASB). (The challenges are especially daunting for an institution using a GASB model that wants to consolidate component units based on FASB standards and completely eliminate inter-entity transactions.) To these pressures are added those related to new cost accounting requirements under the federal Cost Accounting Standards Board (CASB).

Colleges and universities across the continent have reengineered various financial processes, such as purchasing and disbursements, and have begun to implement new information systems to support these redesigned processes. Many institutions (such as the University of California, University of Delaware, and Pennsylvania State University) have focused attention on reducing the paperwork associated with financial activity and have set goals for eliminating paper-based paychecks, invoices, receivables, and other intermediaries of financial transactions.

Different intentions regarding an institution's financial operating environment suggest different approaches and different technologies. For example, a priority placed on the long-term elimination of paper will focus institutional attention in the planning process on strategies such as business alliances and on technologies such as electronic funds transfer, electronic document interchange, and internal electronic transaction forms. The pressure to eliminate paper as a financial intermediary will rise as authentication and security services on networks make it possible for people to identify suppliers and products, and order and pay electronically for goods and services (admissions, library materials and fines, office supplies, etc.).

The bad news, of course, is that the imposition of new regulations and reporting requirements and the redesign of financial processes can be difficult, risky, and costly. The implementation of these new capabilities can be even riskier, more difficult, and more costly, and the systems needed to support them can also be complex and expensive.

In the 1970s, centralized computing architectures and the economics of computing influenced the evolution of a typically centralized financial management environment. The financial officer specified requirements to the administrative information systems office and was either satisfied with the project outcomes, or not. The negotiation over system features and costs was mediated through a structured process, such as the systems development life-cycle model. Decisions typically balanced the needs of the financial office for service, on one hand, with the technical and financial constraints posed by the administrative information systems office, on the other. The needs of the financial office revolved around controlling financial processes, maintaining the general ledger, issuing vendor checks, and the like. Rarely were such systems designed to meet the planning, monitoring, and controlling requirements posed, for example, by complex auxiliary operations or the contract-intensive academic programs found at research universities. Since the intended users of these systems were typically professionals in the accounting office who used them intensively and extensively, the demands and expectations placed on these systems with respect to "user friendliness" were often modest. The failure of many such systems to meet the planning and operational needs of institutional subunits in a user-friendly fashion has contributed to the proliferation of "shadow systems" in these subunits.

New Technology and the Need to Rethink Project Roles

The proliferation of "shadow systems" throughout the institution has helped address the concerns over functionality and ease of use raised in local academic units and auxiliaries. In doing so, however, these systems have greatly complicated accounting and financial reporting at the institutional level, have fostered concerns and problems regarding data quality and synchronization, have created tensions between central organizations and the local units they support, have spawned control issues, and have contributed to varying amounts of workload duplication across the institution. These issues and concerns have played out, in varying degrees, at higher education institutions across the country, as well as in the private sector.

In essence, the proliferation of personal computers, the widespread influence of the campuswide network, and the use of spreadsheets and desktop financial packages have heightened and broadened interest in financial information systems. This increased awareness and the growth of computer and financial literacy across the institution are reshaping the roles and politics of the financial system design process. Financial information systems, in general, can no longer be developed exclusively through the bilateral agreement of the institution's chief financial officer and chief information technology officer. Under today's conditions, the support of these key decision-makers is likely to be a necessary but insufficient condition of project success.

While it is perhaps easy to point to the need to change the project and organizational structures and roles that are needed to support the design of new financial systems, it is *not* easy to elucidate these new roles or structures. On many levels, the answer to these questions is "it depends." The roles, project architecture, ownership, and other key aspects of planning and implementing financial management systems depend on what changes the institution is seeking, who is seeking the change, who commands which institutional resources, and who, in the final analysis, will really step up to the mark and provide project leadership.

As long as computing cycles and accessibility were scarce resources, the natural leadership of projects of this nature often fell to the institution's technology chief. In the current environment of networked computing and diminishing higher education resources, financial managers throughout the institution have an increased stake in the performance and capabilities of the financial information system and are likely to be more interested in and capable of assuming or sharing the leadership of these projects. In fact, some central financial organizations now assume the direct responsibility for providing information systems support.

There is no absolutely right or wrong answer to the question of how to balance project responsibility. The essential message of this book is that this balance of perspectives, skills, and ownership is central to the vitality and success of the project. For this reason, much of the book is devoted to identifying structures and approaches to balancing project responsibilities that can be shaped and adapted by readers to accommodate institutional differences in complexity, objectives, leadership, funding, and other key project success factors.

New Options for the '90s — Partnering

Just as the changes in higher education's climate, operating practices, and information technology base have changed the nature of the internal collaboration on systems projects, these factors have also altered the options that colleges and universities will face with respect to external collaboration.

While in the past the options facing systems planners revolved around the decision of whether to buy an "off-the-shelf" package or to build a system in-house "from scratch," in the late 1990s and beyond the decision is rarely likely to be bipolar. Today, the costs and complexity of implementing new systems suggest the need to ask, "With whom will I need to partner?"

Instead of choosing among decisions at the "build or buy" extremes, today's decision-makers are increasingly faced with a continuum of partnership options, whether building or buying. These include co-developing new software with an industry partner, customizing (to a lesser or greater extent) existing packaged software in-house with an industry partner, and developing software with multiple industry and/or institutional partners as part of a broad collaborative effort. In-house development of applications also involves a partnership – between internal information systems professionals and staff in the business office and other finance areas.

In many ways the decisions about whether to partner, with whom to partner, and how to manage joint ventures represent the moments of truth for any project of this kind. The effective conduct of business alliances and partnerships is a critical determinant of success or failure for those who choose this option. This is a complex topic and is largely outside the scope of this book. We encourage you under all conditions to cultivate at your institution those skills related to administering complex agreements and multi-lateral partnerships.

Emphasis on People and Process

The methods, techniques, and structures that this book describes are independent of the desired institution-wide information technology or business architecture, and are designed to enhance the institutional decision process. When successful, such methods, techniques, and structures enhance not only the quality of technical and business design decisions, but improve the likelihood that the key members of the institutional community – who later will judge and depend on the eventual system solution – will share a sense of responsibility in major project decisions and outcomes.

For this reason, this book recommends using a team structure to bring diverse interests and expertise throughout the institution together in an organized fashion. As with all complex projects, the key to success remains the quality, organizational placement, credibility, and availability of project participants, especially the project management.

The effective deployment of functional teams accomplishes the tasks of:

- breaking the project into components of manageable and well-defined scope,
- identifying clear deliverables and project accountabilities,
- creating a hierarchy of roles that strives to align project decisions vertically and horizontally across the institution, and
- making it possible to compress the project in time by facilitating concurrent team activities.

Having the right structures and people in place makes it possible to lay out the steps in a complex project in ways that convey to every participant and key stakeholder what is to be expected and when.

The endeavor can be viewed as having five major phases: (1) articulating a strategic framework, (2) structuring and managing the project, (3) determining business and technology requirements, (4) selecting a solution, and (5) acquiring and implementing the system. Within these phases many steps will need to be taken and many tasks completed; these are graphically illustrated by process flow charts at the end of Chapters 2 and 3. Highlighted at the close of each chapter are a number of actions that can either greatly enhance or jeopardize the success of the project. Actions that are greatly encouraged and that seem to predispose projects toward success are referred to as *critical success factors*. In many cases, the failure to take a critical action, at a critical juncture of the project, creates added project risks. Such failures to act, as well as ill-conceived actions, are referred to as *land mines*. Finally, a glossary of terms and concepts is provided in Appendix B, to support the technology "awareness-raising" process described in Chapter 4.

No book of this kind can be as prescriptive as a cookbook, because no set of financial management needs is likely to be a standard for higher education. Even cookbook recipes fail when the cook doubles specified quantities or does not take into account variations in humidity, altitude, or other local particulars. Despite this caveat, the authors believe that all projects of this kind have certain common elements and benefit from a project architecture that is inclusive, open, and consensus seeking. We hope the steps, structures, and techniques described in this book – and the success factors and potential land mines highlighted – will help you effectively and successfully lead, monitor, or support such projects at your institution.

Chapter II Overview

- Creating an Effective Steering Committee
- Building the Case for Action
- Establishing a Vision
- Establishing Planning Principles
- Evaluating Readiness for Change
- Articulating Goals and Strategies
- Developing a Decision Framework
- Communicating Directions: The Steering Committee's Report

"Ideally, the development of sound financial systems that will serve for a decade or more depends on the explicit linkage between the institution's academic plan and vision, its envisioned business and financial model, and its envisioned information technology architecture."

II: Articulating a Strategic Framework

The financial system of any college or university is an essential element of its management infrastructure. The financial system is also a key element of the institution's information technology architecture. Thus the decision to replace, upgrade, or otherwise modify major components of this system should be viewed as being strategic to the institution.

It is sometimes the case that while the business leadership of an institution is keenly aware of the strategic importance of the financial information system, the academic leadership may not view the financial system in such a light and may be hesitant to divert funds from academic programs towards efforts to upgrade an administrative system. Even when there appears to be general agreement that a new financial system is needed, a high-level planning effort will be needed to evaluate the extent to which and how financial practices, processes, and systems should be changed.

Thus the first and most critical step in planning a new financial system is to bring together institutional decision-makers, opinion leaders, and key stakeholders from diverse areas across the institution, and from the major constituents who will be served by the system, to serve as a steering committee to articulate a strategic framework for the effort and to provide leadership for the project.

Creating an Effective Steering Committee

To be most effective, such a steering committee should be sponsored and appointed by either the president or chancellor or by the senior executive officer responsible for financial operations and administrative systems. If this responsibility is divided between two senior officers, then either or both might sponsor the steering committee.

As financial systems no longer support, exclusively, the financial operations of the central administration (e.g., accounting office, purchasing, disbursements), the chief financial officer (CFO) rarely has either the organizational authority or political capital to lead an institution-wide financial initiative alone. For similar reasons, the chief information technology officer can rarely operate in isolation in making technical decisions that will influence campus financial practices and processes. In highly distributed and loosely coupled environments, changes in the financial systems will be viewed as having a major impact on academic activities as well. Thus the leadership of the steering committee might come from both the CFO and chief technology officer in partnership. Depending on institutional culture, the budget officer and/or senior academic officer might also play leadership roles.

Given the interrelationships between student systems and financial systems and the trend to distribute information access to academic departments, high-level representatives from the student services office (and academic affairs if the senior academic officer is not co-leading the steering committee) will also need to be active at the strate-

The Steering Committee's Mission

- ✓ Define and communicate the case for developing a new financial system for the institution.
- ✓ Establish a vision that ties together the institution's academic needs and aspirations with a proposed financial and business systems architecture.
- ✓ Develop a set of planning principles that will help define the scope and character of the project as well as provide the means to evaluate its outcomes.
- ✓ Establish, through an assessment of various tradeoffs, the high-level scope, boundaries, and priorities of the project.

gic level. Representatives from the institution's internal audit office and auxiliary enterprises should also be included on the steering committee. In a large university, business officers from major academic units might be steering committee members, as might representatives from the health sciences sector in institutions with medical schools and/or clinical facilities.

Most colleges and universities have a great deal of diversity of systems, so it is also wise to ensure representation of different computing environments or platforms and to seek representation from both large and small units across the institution. The needs of units with extensive systems staff will be different from those with few or no such staff. The latter units may require financial systems that minimize training time, are intuitive, and provide many prepackaged templates and require very little manipulation, while larger campus organizations may prefer to have direct access to financial databases and may desire to customize user interfaces and functionality of the systems.

The steering committee's charge should be stated in writing with as much specificity as possible, including a clear statement of responsibilities and a suggested overall time frame. The committee will be the visionary and architect of the overall project, particularly active in the early stages. However, it will also play essential problem-solving, political, and communications roles and should remain "in business" throughout the project's life.

The roles of the steering committee include:

- establishing the financial architecture of the institution through a process of creating a vision and setting goals;
- developing the framework for discussing potential tradeoffs in the institution's decision to build or buy software or to engage in strategic external partnering for software development;
- issuing a report to inform the institution of the strategic directions that have been articulated;
- appointing a project manager and project management team and "steering" the overall institutional effort through implementation;
- approving project plans, budgets, deliverables, and time lines proposed by the project management team; and
- communicating across the institution and within vertical units to convey "ownership" of the project and project decisions.

It may be desirable or necessary to have the steering committee appoint ad hoc subcommittees as strategic planning proceeds for the project. These subcommittees may focus on areas such as scanning the external systems environment (both at other institutions and in the marketplace), reviewing literature on higher education financial systems, interviewing campus customers, communicating findings and directions to the institutional community, and other areas of interest where involvement of the entire steering committee is not practical.

It will also be necessary to appoint a project manager and project management team to carry out the remaining phases of the project. Like the steering committee, the project management team may also find it necessary or desirable to appoint one or more ad hoc teams to carry out specific functions.

In general, it will be important to distinguish between the two standing groups — the steering committee and the project management team — and the myriad ad hoc teams that may be needed to accomplish focused and specialized tasks. The standing groups will generally last throughout the duration of the project, while ad hoc groups will be formed to address specific tasks during the course of the project and will exist only as long as needed to accomplish those tasks (see Figure 1).

Building the Case for Action

While one of the first tasks of the steering committee will be to establish a vision for the future financial operating environment, before undertaking that effort the committee will need to confirm that the institution is willing to spend significant resources and invest valuable staff time in a new financial system, and what the reasons are for agreeing to such an investment.[1]

Identifying the drivers for change

The steering committee may find one or more of the following among the drivers for a new financial information system:

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[1] Opinions differ about whether the vision-setting process should precede or follow the process of making the business case. If you believe that a compelling vision will help to establish the case for change, the process of setting that vision might come first.

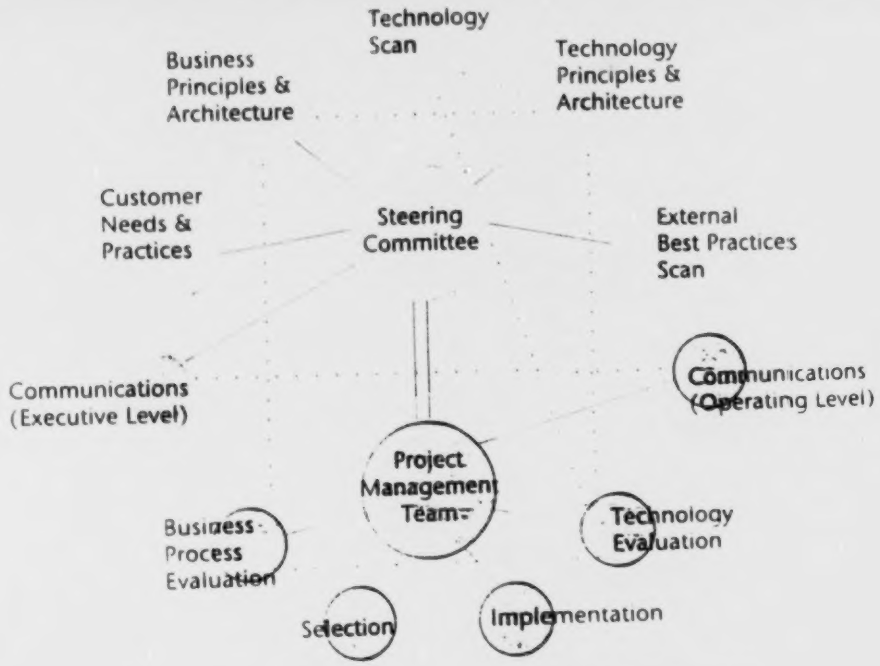

Technology Scan
Business Principles & Architecture
Technology Principles & Architecture
Customer Needs & Practices
Steering Committee
External Best Practices Scan
Communications (Executive Level)
Communications (Operating Level)
Project Management Team
Business Process Evaluation
Technology Evaluation
Selection
Implementation

Figure 1:
Project roles and structure

The scope of the project and the complexity of the institution will define the number and nature of standing and ad hoc groups that will be needed. The small "balls" in this figure describe roles to be played either by the steering committee and the project management team or by specialized ad hoc subcommittees or teams formed to satisfy these roles. Whether formalized in team structures or not, these roles are essential elements of the overall effort.

Need for management information. One compelling reason for an institution to face the challenge of implementing a new financial system is the need to have reliable, accurate, timely, and useful information on which to base decisions. The importance of having a financial system with these characteristics cannot be overestimated in terms of the value to faculty for timely information on grant balances, to academic unit administrators for optimizing the use of their resources, to managers of self-funded enterprises such as bookstores and student housing to manage their bottom lines, and to college presidents who may oversee macro-level allocations, budget reductions, and new opportunities across the institution.

Aging technology. An institution that has used the same financial system for the past 20 years will likely recognize that technology available today can provide capabilities not possible with the aging technology employed by its current systems. Given dwindling resources and increased competition for enrollment, it is becoming very important to be more responsive to the marketplace and to have systems that enable more efficient and effective administration. Thus having the ability to separate transaction systems from decision support systems, and/or migrate from character-based interfaces to intuitive graphical interfaces may well be drivers for changing the financial system.

High costs. The costs associated with maintaining legacy systems can be a key motivator to move to a new financial system. These costs can include the cost of maintaining the hardware of a proprietary mainframe-based system, the cost of maintaining and enhancing the software of the legacy system, the cost of not having a flexible system that will enable streamlining of key business processes, the cost of not managing cash balances in an optimal fashion that maximizes interest income and minimizes working capital expense, and even the cost of providing electricity to the legacy systems.

New leadership. While colleges and universities are charged with the discovery of new knowledge and the dissemination of knowledge, they can also be remarkably slow to recognize and correct inadequacies in their information infrastructure. Often such a change is prompted by the arrival of a new president or chancellor, a new director of information technology, a new accounting officer, or a new senior administrative officer.

Capturing stakeholder input to build a business case

Having support for change from a respected and highly placed steering committee is a necessary but rarely sufficient condition to effect that change successfully. Changing financial systems will have an impact on the lives of many "stakeholders" in the existing system, so it is critical that these members of the campus community buy into the need for change.

While many of these stakeholders may complain about current aging financial systems, the steering committee must not mistake such complaints as a signal that the case for change has been made or is self-evident. This distinction is subtle but important. These are the systems people "love to hate," and business systems, practices, and infrastructure that people love to hate are systems around which fundamental elements of organizational culture arise. While we all complain about a fiscal closing process that occupies three months of every year, the process is nonetheless the one we know best, and our jobs are defined by such disagreeable systems.

Thus, developing a sound business case for change is an essential and early responsibility of the committee that will guide the development and implementation efforts, especially through the times when doubt surfaces in the face of the reality of difficult change. The particulars of the business case will vary greatly from one institution to another and will embody the highest-level institutional objectives and aspirations both in the area of financial management and in the specifics of the existing financial operating environment. In spite of this wide variation, the process of building the business case has a number of common elements.

First, the steering committee should identify in specific terms the principal stakeholders of the institution's financial system. The essential point here is that the financial system is a nearly ubiquitous manifestation of the institution's business architecture and, as such, affects — directly and indirectly — surprising numbers of people. In addition, the steering committee must recognize that the institutional culture is not monolithic; that is, various stakeholders are affected differently by the financial system. These stakeholders will have different views of the existing financial system, different needs and aspirations about the future, and consequently differing assumptions about the need for change and the nature of the needed change.

One methodology for "mapping" the views of the college or university community regarding both the existing financial system and high-level future aspirations is the deployment of interview and focus group teams. Typically, organizing for this activity will reveal stakeholders such as the following:

- Trustees
- President or chancellor
- Vice presidents or vice chancellors
- Deans
- Faculty
- Academic officers
- Academic business officers
- Student services administrators
- Information technology staff
- Departmental accounting staff
- Central accounting office staff
- Purchasing officers
- Grants management staff
- External and internal auditors
- External stakeholders (e.g., research sponsors, vendors, trading partners)

While most of these stakeholders will have some representation on the steering committee, it is a good idea to survey or organize focused discussions with other individuals from these groups to elicit their views about their current and future financial management needs. Not surprisingly, this review will reveal both common and divergent needs and wants. What the steering committee learns about universal views and particular views will inform the overall financial management vision of the future financial environment, will help set early project priorities, and will guide the development of an institution-wide communication strategy to support the project. Table 1 illustrates how the information elicited from a few hypothetical stakeholder discussions can be organized to reveal both common and divergent perceptions about the existing financial system and the needs or beliefs about future change.

The focus group and interview approaches can be supplemented with easy-to-use surveys of stakeholder needs, beliefs, and satisfaction with the existing financial system. Information from such surveys can also go far toward preparing the ground for change, including broad elements of the institution in the process of change, and building a tangible and compelling case for change (or not!).

The deployment of processes to elicit the differing views of the financial system does not need to be analytically rigorous, or expensive. Remember, the purposes of this activity are to: (1) prepare the ground for change, (2) convey that the process of change is intended to be inclusive, (3) uncover high-level commonalities and differences of views, and

Table 1: Capturing stakeholder input

STAKEHOLDER	VIEW OF PRESENT	NEEDS FOR FUTURE
Trustees	Information is dated Financial statements are hard to read Budget and expenditures don't reconcile	Less data, more information A "unified" budget across all funds Better cost information
President	Every information request is ad hoc Information is dated Can't tell if institution is overspending Too many transactions	Financial analysis tools More timely information More cost information
Academic Officers, Academic Business Officers	Lack of timely expense information Complex and aggravating fiscal closing processes Difficult to track expenses versus budgets Noncompliance with federal terms and conditions Weak or nonexistent anlytical tools	More local accountability demands better financial analysis tools and work Improved compliance monitoring on contracts & grants Reduction in departmental shadow systems
Chief Technology Officer	Legacy systems expensive to maintain Data integrity concerns Expensive report generators Diverse desktop platforms Incomplete network connectivity Legacy systems impede progress toward new architecture	User-supportable systems Enter data once, use many times Customizable online reporting Common graphic user interface, seamless interoperability Robust and ubiquitous campus network Scalable and portable applications
Chief Financial Officer	Information is dated Financial performance hard to convey Proliferation of shadow systems adds risk Decision support needs unmet Practices are labor intensive and costly	Information is accessible Reports are comprehensible Enter data once, use many times Specialized decision support tools as needed Electronic approvals and commerce
Technology Staff	High-maintenance legacy systems Increasing user independence Pressures to reduce reliance on mainframe Pressure to adopt client/server models Batch systems	Increased system modularity Increased integration among systems Online systems, reliance on networks Graphic interfaces, heterogeneous platforms Support for distributed computing
Faculty	Lack of timely expense encumbrance and balance information on grants and contracts Confusing written financial reports Information not easily accessed from multiple platforms	Timely online information Online purchasing Checkbook-register ease of use Automated controls for compliance with different contract terms and conditions

(4) supply "back of the envelope"-quality information to help the steering committee members understand potential priorities and pockets of potential project support or resistance. If resources permit, the use of outside facilitators to conduct this early discussion will go far in building objectivity into future project plans and actions.

Establishing a Vision

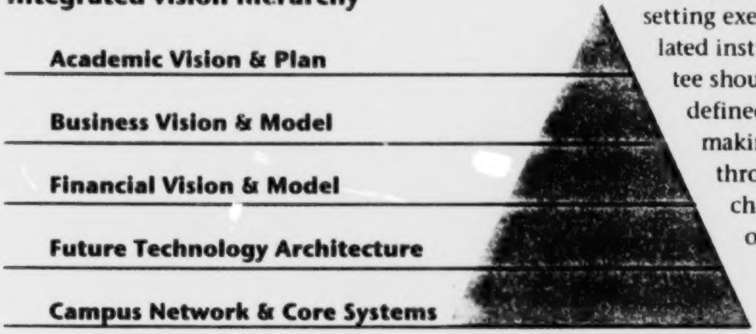
Involving major stakeholders in making a business case for change provides members of the steering committee with the information they will need to engage in an essential discussion about, and establish a vision for, the future of the institution's financial operating environment. At this still-early stage of the project, the steering committee members must resolve the strategic and fundamental question of incrementalism versus dramatic change. Based on the feedback of major stakeholders, the steering committee must answer three questions:

- How much in need of change are the existing financial processes and systems?
- How different will the institution's future be from its past?
- What are the key attributes of a new system?

The resolution of these questions will define much of the scope of the project ahead and will also drive decisions about the roles and responsibilities that people will associate with the project.

One method of resolving these questions is to create a "vision" of the institution's future financial environment. The process of creating a vision is one in which the steering committee in a concentrated period (one to two days) assesses and organizes the information collected from the stakeholders and makes fundamental planning assumptions about the nature of the future academic focus, the envisioned institutional "business model," the institutional financial model, and the nature of the institution's future information and technology architectures.

Figure 2: Integrated vision hierarchy



The process of establishing a vision is an essential one, and one that is both difficult and exciting. Setting the context for discussion at some realistic time in the future (often five years) usually invokes people's creative instincts and reduces some of the territorial "politics" of the present day. The difficult aspect of this process in the higher education context is the typical lack of explicit institution-wide plans or visions for the core academic enterprise. Ideally, the development of sound financial systems that will serve the institution for a decade or more depends on the explicit linkage between an academic plan and vision, its envisioned business and financial model, and its envisioned information technology architecture. The relationship of elements of such an integrated vision can be described as a hierarchy, with the financial system and campuswide network forming essential elements of the base infrastructure (see Figure 2).

While the creation of such a vision is a consensus-building exercise, the nature, decentralized structure, and even mission of most colleges and universities make it unlikely that senior planners will "uncover," in any one place, explicit institution-wide academic visions and plans. (It is more likely that a future information technology architecture has been articulated in a vision or planning document, including strategies for the campus network and core systems.) The absence of clear guidance at "the top of the pyramid" weakens vision exercises, but neither dooms them to failure nor consigns the results to the realm of irrelevancy.

Steering committee members will need to resist the temptation to abandon or delay the vision-setting exercise owing to the lack of an articulated institutional vision. Instead, the committee should develop a surrogate (and loosely defined) vision of the institution's future by making some well-informed assumptions through discussion with the president or chancellor, and with key academic opinion leaders.

Each institution's vision process will be different and will yield very different results. This processing can be structured around answering a number of high-level questions in four areas: the academic enterprise, business and financial enterprise, cultural and organizational environment, and information technology enterprise and architecture.

Academic enterprise

- *Student Enrollments*

Are student enrollments increasing or decreasing? (This is not simply a matter of revenue; the financial systems will need to integrate with the student systems.) Where is growth and/or contraction occurring? Is your institution attracting more adult and part-time students? Is the percentage of students on financial aid increasing or decreasing? What are the trends in how students pay their bills? Are credit or debit cards an element of the envisioned environment? Is student revenue rising or falling as a percentage of total revenues?

- *Research Funding*

Is research funding increasing or decreasing? How dependent on research funding will the institution be in five years? ten years? What is the mix of federal, state, and private funds for research? What are the regulatory, reporting, and audit requirement trends in these areas?

- *Academic Growth or Retrenchment*

Where is academic growth or retrenchment occurring? Is your institution committed to a balance of the liberal arts, or is the shape of the academy "following the funds"? What are your institution's academic centers of excellence, and is there a long-term commitment to maintaining these historical strengths? What are some of the new emerging growth disciplines, and what are the financial characteristics of these disciplines? Are there plans to evaluate the cost effectiveness of program and course offerings and the potential related investments in instructional technology?

- *Distance Learning and Extended Education*

Does your institution have a plan in this area? What student markets do you wish to reach and to emphasize? What are the financial/consumer behaviors of students in these markets? The financial system serving a "distant learner" will be organized differently from one organized for the traditional 18- to 21-year-old resident undergraduate.

Business and financial enterprise

- *Revision of Existing Chart of Accounts*

Does your institution desire or need to retain its chart of accounts? How many "charts" do you need for external and internal reporting? The nature of the chart of accounts, and how flexible your institution can be in this area, will be a determining factor in the number and type of financial systems that will be options for your institution.

- *High Tech Versus High Touch – or Both*

Will your institution emphasize high tech, or high touch; that is, how important will human intervention be in the way your institution interacts with financial stakeholders such as students, faculty, vendors, and others? What kind of management system or model will you have?

- *Business Philosophy and Practices*

How important is speed and flexibility to your institution's business success? Does your institution "go after" purchasing discounts aggressively? How does the age of campus receivables (federal contracts, student) affect campus financial performance? What place do electronic data interchange and electronic commerce have in your institution's future? Are there currently numerous "shadow systems" or duplicate financial books? How important is standardization and elimination of work duplication?

- *Accountability and Control*

What is your institutional philosophy of internal control? What is the envisioned financial control system? Are multiple approval signatures an embedded element of institutional operating practices? How important is control over financial commitments and expenditures, and how current must that information be? What is the organizational unit of accountability for expenditure control? for revenue planning and control?

- *Business Complexity*

How diverse is your institution's business enterprise, and will this enterprise become more, or less, diverse over time? How tightly integrated are enterprises like medical centers with the financial activity? What role do the auxiliary enterprises play and how specialized are their needs?

- *Business Image*

How important is your institution's image as a business entity? How does the governing board view the institutional business enterprise? Do outside entities (vendors, contractors, research sponsors) like doing business with your institution? Does your leadership value your institution's business image?

Cultural and organizational environment

- *Decision-making Style and Structure*

How are decisions made at your institution and what are the financial consequences? Are financial decisions and accountabilities delegated to the deans and department chairs or to central campus officers? How much reliance is placed on financial information to inform decisions? Where is the locus of budgetary control? Are operations being recentralized to control costs, or is your institution moving to models like responsibility center management?

- *Technological Sophistication of the Customer Base*

Are the primary users of the envisioned financial system computer literate? Do financial planners and analysts, for example, use sophisticated computer-based analytical tools? What is the employee turnover rate likely to be among various system users? What is the institutional commitment to training for those who will use the financial system?

- *Attitudes and Values Regarding Business Partnerships*

One strategic decision that nearly every college or university planning a new financial system will face is whether to purchase vendor solutions or build systems in-house or in partnership with other institutions and/or vendors. Attitudes, values, and skills across the institution will influence this decision strongly. Is joint or contractual development and/or operation of the financial system a desirable planning option for your institution? Do the skills to manage such relationships currently exist at your institution, in the financial and/or information technology organizations?

- *Use of Management Information*

How do different institutional financial stakeholders use financial information? In what form (reports, online, raw data) is financial information used? What key information is not available? How important is the currency of financial information to different stakeholders? Is financial planning and analysis an activity widely practiced across the institution, or is it localized in the institutional budget office or the auxiliaries?

Information technology enterprise and architecture

- *Institutionwide Computing Directions*

Financial systems that are developed today require data connectivity to virtually every office that either deals directly with the financial system, or is connected indirectly via one of many auxiliary or peripheral systems that transmit information to the financial system. How technically heterogeneous is the institutional computing environment? Is a campuswide network in place? Is it robust and considered important? Are there standards and strategies that assure the existence of a basic level of workstation capability and network connectivity among those who will use the financial system? What is the expected level of interdependence among institutional systems, such as the general ledger, budgeting system, purchasing and A/P systems, student systems, and departmental accounting systems? What is the institution's attitude about mainframe computing and client/server computing? Is there recognition of the need for life-cycle budgeting to support the network infrastructure as a utility? If the envisioned business architecture assumes widespread electronic commerce, does the infrastructure exist for authenticating users of the financial systems?

- *Level of Technical Expertise*

Depending on the characteristics of the new financial system, the institution will need varying levels of technical support for the planning, development or purchase, implementation, and ongoing maintenance of the new financial system. Are current technical staff knowledgeable and skilled in newer technologies? The configuration of the new system may also dictate the location of such expertise, depending on whether it will be on a central mainframe or distributed on database servers throughout the institution. Do technical support staff reside primarily within the administrative computing department, within the central functional units (e.g., the accounting office, budget office), or at a dean's office or academic department level? Does the financial office have the technical and managerial wherewithal to manage large software development and implementation projects?

In many cases, the vision process can benefit from the use of a professional facilitator. Most effective vision activities are supported by a moderate amount of staff data collection and analysis and, as suggested earlier, can be concluded in a brief, one-to-two-day retreat.

The key to success in creating a vision is not only to ask the right questions, but also to keep the dialogue at a very high level. There will be pressures to "dig deep," but this is not the time to do that. Keep in mind that the primary objective of the vision session is to establish the general shape and direction of the project. Teams appointed later in the project — to undertake business process evaluations and a detailed information technology evaluation — will test the assumptions and beliefs established in the strategic overview stage.

Having completed the vision exercise, the steering committee should develop a simple, concise vision statement to serve as the foundation for the financial systems project. For example, the University of California is developing its financial systems based in part on the following vision:

> "In the year 2000, most or all of the University's internal and external commerce will take place electronically. Electronic funds transfers will help [the University] pay its employees and vendors, while electronic data interchange will simplify a host of financial processes (e.g., order entry) that link [the University] with our customers, trading partners, and regulatory agencies. The focus of University financial operations will be on the elimination of transactions that demand cash, checks, invoices, or other labor-intensive transactional intermediaries."[2]

A vision such as this has significant design implications and can galvanize interest and support across the institution in powerful (good and bad!) ways.

Establishing Planning Principles

The effective implementation of such a high-level vision depends on the existence of a set of principles to guide downstream decisions. An exercise to develop such principles for the new system should be the next order of business for the steering committee. Principles are typically developed in the form of declarative statements of design intentions. For example, planning principles recently adopted by the University of California as part of its process of establishing a strategic framework for implementing a financial information system include the following:

- Design for the future
- Design for effective and efficient internal control
- Leverage existing investments in the financial management infrastructure
- Design for ease of use by the primary stakeholders

(These principles are elaborated in a sidebar on the next page; additional examples of planning principles from other institutions are included in Appendix A.)

When partnerships with external vendors or other institutions are anticipated, the steering committee will need to develop principles that define desired partner behaviors and parameters, as well as expected partnership outcomes.

Principles, like vision statements, have the potential to create powerful consensus and good will for the project. They often appear to be simplistic or superficial in nature. While this *can* be the case, it rarely is. Principle statements that are developed in an atmosphere of commitment, trust, and mutual respect are often compellingly simple, rather than simplistic. The process of establishing these fundamental statements often creates the glue that holds projects of this kind together for a successful conclusion. Most important, these principles form much of the yardstick against which elements of the future system are judged and against which design decisions can be evaluated.

The vision and principles of the steering committee form, in essence, a touchstone for the project. They also define — with project budget and scheduling performance — the basis on which key project milestones and outcomes can be evaluated. Throughout the project and especially during major milestone reviews, project design and implementation decisions should be reconciled to the stated vision and principles. On an informal and ongoing basis, steering committee members must always ask how a recommendation or choice will move the project closer to realizing the stated vision.

During formal reviews of project milestones, elements of the vision and principles can and should

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[2] *Report of the Financial and Accounting Systems Task Force* (Oakland, Calif.: University of California, 1994), 12.

Sample Planning Principles

✓ **Design for the Future**

An institution's financial operations and information architecture should be designed for the future, and should exemplify the goals of simplification, localization of decision-making, customer service, innovation, and evaluation of outcomes.

✓ **Design for Effective and Efficient Internal Control**

Internal control is broadly defined as "a process, effected by an entity's Board of Directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories: (1) effectiveness and efficiency of operations; (2) compliance with applicable laws and regulations, and (3) reliability of financial reporting."[3] While an institution's underlying control objectives may not change, there is a significant change in how colleges and universities are implementing such controls. To enhance the flexibility, agility, and service orientation of administrative operations and to leverage the full capacities of employees and new technologies, "management should no longer attempt to control processes but must focus on controlling exposure to risk."[4]

✓ **Leverage Existing Investments in the Financial Management Infrastructure**

As an institution's operating and technology environments become increasingly complex and as administrative resources become more scarce, investments to support financial management must be leveraged to the greatest extent possible. Through the 1980s, when mainframe-based transaction processing investment provided the infrastructure for many campus financial systems, leverage was a function either of scale or of commonality. No institution can afford to simply throw out the investment in personal computers, networks, and many other subsidiary and auxiliary systems; it must decide what it can keep and what it must discard.

✓ **Design for Ease of Use by the Primary Stakeholders**

Campus users' expectations for financial systems have gone beyond unfriendly terminal emulation screens and unreadable reports and ledgers. Primary stakeholders will expect the new campus financial system to be easy to use and intuitive in its "look and feel,"to integrate well with other application programs on their desktop, and to require minimal training. Stakeholders also know that today's technology allows for these characteristics, and therefore will not accept a system that doesn't offer significant improvements over their current system.

be translated into formal measures to help assess the outcomes of the project. If, for example, there is a vision of robust electronic commerce, the percentage of payroll, purchasing, and other transactions performed electronically can be measured. Some of these measures should be devised early in project planning, for even successfully implemented projects can fail in the minds of some campus constituents for lack of effective communication of project success in measurable terms.

Evaluating Readiness for Change

At this stage of the planning process, steering committee members will have developed a high-level, shared vision of the target campus business model, agreement on basic assumptions about the financial system to support this model, and a set of planning principles that will guide the project. The next steps will be to assess more closely the potential barriers to change, and then to validate the vision and principles by communicating them to the campus community and eliciting feedback.

Identifying potential barriers to change

While the strategic planning process for the systems project has been enriched by informed discussion, it probably has not yet taken sufficient account of the barriers likely to emerge in moving from a strategic discussion to a live project.

The primary barrier to initiating a project of this magnitude is the lack of executive management support. While executive management should be well represented on the steering committee, members of the committee must not assume that other institutional leaders either understand or share the conclusions of the planning process. At Wellesley College, for example, although senior management was involved throughout the planning process, the full understanding of what such a project would involve did not crystallize until the actual implementation was under way. Failure to achieve the fully knowledgeable buy-in and support of executive leadership can put the project at risk downstream when the inevitable challenges will occur and financial commitment can waiver.

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[3] L. Hubbell and J. Dougherty, *Cost Effective Control Systems for Colleges and Universities: A New Paradigm* (Washington, D.C.: NACUBO, 1992).

[4] *Higher Education Management Newsletter* (Coopers & Lybrand, August 1993), 13.

Another major and often overlooked barrier to change is the institutional culture. If the steering committee's vision of the future includes the elimination of paper-intensive approval processes, the adoption of new credit and debit cards, and substantial reliance on business partnerships, while the current practices at the institution are labor- and paper-intensive and highly centralized, there is a high risk of employee resistance to the planned changes. Again, the current financial operating environment — and its systems — may be universally hated, but social psychologists warn us that people will often show a preference for the devil they know than for future uncertainty.

In the past few years, a number of institutions — for example, the University of Michigan, University of California, and Pennsylvania State University — have worked with consulting organizations to devise survey tools to assess cultural resistance to change on their campuses. The deployment of these tools can be a cost-effective way to assure those affected by the potential change that their concerns are being accounted for in the project planning. These tools can also go far in highlighting where attitudinal, training, and other gaps are likely to be found throughout the institution and where management attention can be focused throughout the project.

A third major barrier to change is the state of the institution's existing information technology infrastructure. This area, which depends on the institution's historical investments in and approach to information technology management, is often one that can be a showstopper. For example, if the institutional vision is to decentralize online financial transactions to academic departments, the state of both the workstation environment and the local and campuswide network connectivity will either enable or hinder progress toward achieving the vision. The lack of modern computers or a robust and widespread campus network can force project planners to conclude: "We can't get there from here."

Validating the vision and principles

At this stage, members of the steering committee must become champions of the vision and principles they have created and must begin to bring their peers and organizations into this vision. Foremost, the preliminary statements of the steering committee must be discussed among members of the president's or chancellor's cabinet, the council of deans, and among the leadership of the academic senate. These discussions should conclude with either a clear direction to move ahead or clear course corrections.

It may also be wise to hold campuswide forums to draw comments and suggestions on the vision and principles for the new system and how the new system will interrelate with other systems. This broadening activity can be accomplished in a number of ways. No matter what approach is taken, it is essential for the steering committee to communicate their leanings and enthusiasm in ways that (1) elicit honest feedback, (2) ignite enthusiasm for moving ahead, and (3) manage expectations of the campus community.

Articulating Goals and Strategies

Having evaluated readiness for change, the steering committee is ready to establish goals and strategies to guide the project teams and investments. One methodology for framing the development of such goals and strategies is conducting a gap analysis.

In essence, the steering committee at this stage must understand how much change this project will introduce to the institution in order to set priorities and develop programs that will mitigate the potentially negative effects of the change. The failure to assess realistically the gap between the desired "future state" and the "current state" will result in overlooking important areas of risk and needed investment.

Conducting a gap analysis

A gap analysis is neither difficult nor expensive. It can be as simple as the illustration provided in Table 2. This example is clearly polarized to highlight areas where extreme differences between the current and future environments can occur. Each of the gaps defined in this process can be narrowed through the development and deployment of different project goals and strategies.

Developing the gap analysis, then setting goals and developing strategies to reduce the likely gaps, will help the project sponsors and other members of the steering committee develop realistic priorities and assess the realistic resource requirements associated with this project.

Assessing resource requirements to close the gap

Once the gap analysis has been performed, it is important to attach resource requirements to the elements identified in the analysis – that is, the areas of needed investment that fall between where the institution is and where it wants to be – to ensure realistic goals and strategies. Resource requirements include, but are not limited to, the following components:

One-time development costs. One-time costs may include software acquisition or development, hardware procurement or upgrade, training of system users and administrators, the opportunity costs of staff dedicated to system design and implementation, the hiring costs of any outside consultants for development, and other specific project costs.

Skill development. In addition to the initial training required for users and systems administrators, there will be an ongoing need for training of users of the financial system. These costs can be managed to a large extent depending on the characteristics of the system solution that is selected. For example, a financial system that has hundreds of screens that must be navigated, in which each screen has many codes, will require much more ongoing training investment than a system that has a minimal number of screens and reports, with each screen and report organized intuitively, and which includes context-sensitive, online help facilities and integrates well with applications that are already in use at the institution.

Computing infrastructure. The new system will possess different performance attributes and will generate new patterns of use at the institution. These changes will consume different amounts of the institution-wide computing infrastructure. Planners of new financial information systems will need to forecast those incremental infrastructure consumption costs early in the planning process.

Other ongoing expenses. Other miscellaneous costs include those associated with post-implementation maintenance (who and how), replacement of hardware downstream, future development expenses, and so forth.

A key concept associated with assessing resource requirements is that of life-cycle costing. Too often, project planners focus attention on a variety of one-time costs, such as hardware and software acquisition, training, and the like. Experience shows that these costs, while significant, are often the smaller

Table 2: Gap analysis

CURRENT STATE	FUTURE STATE
The Cultural Environment	*The Cultural Environment*
Centralized decision-making	Distributed decision-making
Information closely held	Distributed information
Resistant to change	Embraces change
Organizational territoriality	Collaboration
The Business Environment	*The Business Environment*
Multiple transaction approvals	Online transaction approvals
Central office driven	Distributed authority
Paper intensive	Reduced paper
Information scarcity	Distributed information
Focus on controls	Focus on service quality
Labor intensive	Automated wherever possible
The Technical Environment	*The Technical Environment*
Mainframe based	Client/server based
Homegrown software	Vendor-developed software
Batch processing	Online transaction processing
Technical homogeneity	Technical heterogeneity
Stand-alone systems	Integrated systems

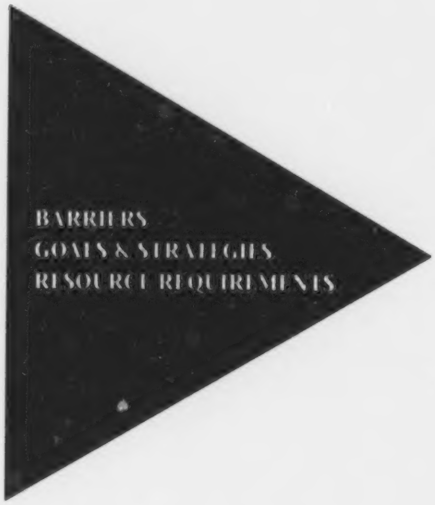

Table 3: Tying goals and strategies to planning principles

GOALS	**STRATEGIES**
Planning Principle #1: Design for the future	
Localize financial accountability	✓ Departmental online access to campus transaction systems
	✓ Departmentally accessible decision support system
	✓ Online transaction processing
Planning Principle #2: Design for ease of use	
Reduce training time and effort	✓ Graphical user interface and sophisticated online help
	✓ User-friendly reporting templates and natural query languages
Integrate systems to interact seamlessly across campus functions	✓ Common user interface and data dictionary across applications
	✓ Data warehouse with single interface
	✓ Software "hooks" across applications
	✓ Mapped process and information flows
Planning Principle #3: Design for efficient, effective internal controls	
Reduce the number of "shadow systems"	✓ Separate transaction processing from analytical processing
	✓ Implement easy access to local (e.g., departmental or individual) information
	✓ Assure the timeliness and quality of financial data in campus systems
Improve campus financial management	✓ Embed process controls in systems to streamline approvals
	✓ Provide secure, clear, and easy-to-understand audit trails in transaction processing systems

elements of total project costs when they are viewed in light of the useful life of the technology being considered. Hardware and software depreciation, network upgrade management expenses, software maintenance, and a variety of recurring expenses must be accounted for in the communication of project resource requirements. The failure to look at costs on a life-cycle basis can put projects at risk by understating true costs.

The steering committee is charged with overseeing institutional investments in this project, but is not typically responsible for the detailed costing of planning alternatives that are to be evaluated. Its role at this stage of the project is to identify the various cost categories that are likely to characterize projects of this kind and to help identify where large categories of cost are likely to fall. If training costs are likely to be felt strongly by deans and department heads, then either strategies must be developed to finance these costs, or advance warning must be issued to ensure that downstream funding surprises do not erode institutional support for the project.

Goals and strategies should relate strongly to the vision and principles developed by the steering committee in the earlier stages of the planning process. Table 3 provides an example of how goals and strategies can be linked to the principles that have been established.

Developing a Decision Framework

If successful, the steering committee's planning process will navigate the institutional leadership through a great many of the key scoping decisions of the project. These scoping and priority decisions define early in the project the potential "wins" and "losses" associated with the inevitable tradeoffs that will occur in any major systems endeavor.

Understanding the tradeoffs

In this strategic phase of the project, the steering committee will need to weigh potential tradeoffs in a number of areas. Such discussions should result in strategic recommendations that will help to guide the work of the project management team.

Incremental change versus fundamental change. The steering committee should address whether or not the replacement of the core institutional financial system should open the door for a significant review of institutional financial practices. For example, a stated goal of being a "close follower" in technology, coupled with a goal of centralizing financial management responsibilities at your institution and a stated principle of maximizing the utilization of the campus mainframe computer, may suggest an incremental improvement strategy. A leadership decision to implement responsibility center management, on the other hand, suggests the need for significant new technical solutions.

Host-based versus client/server architecture. A presumption of this book is that your institution has articulated an information technology strategy that addresses whether administrative systems will continue to be mainframe-based. It is essential that the steering committee understand that strategy and incorporate thinking about the financial information systems into the context of the planned institution-wide technology architecture.

This is a difficult but essential activity. It is difficult because the range of technology alternatives available to colleges and universities is greater than ever and because the life cycles of these alternatives are becoming more and more difficult to plan for and manage.

At many large research universities, architectures that distribute data handling responsibilities and those that operate in graphical user environments are preferred increasingly to traditional mainframe applications. These architectures are needed to support the decentralized environments of these institutions and to facilitate organizational efforts to localize decision-making.

Two factors that should be included in any such tradeoff discussions are that (1) currently there are not as many commercial client/server solutions available as host-based products, and (2) it can be difficult to integrate client/server solutions with preexisting mainframe systems. Client/server solutions also assume that substantial investments have already been made in the campus telecommunications infrastructure and a contemporary end-user desktop computing environment. Client/server architectures can be riskier to develop and maintain, can be costlier, and will distribute a number of support and maintenance costs to the end user. Recalling, however, that financial systems usually have long lives, the real risk may be in failing to consider such solutions.

In general, financial systems should not be the driver of infrastructure investments. As with all tradeoff decisions, each college and university will have to strike its own unique balance of risk, future orientation, user satisfaction, and cost. The marketplace is changing rapidly, with new vendors emerging on the scene with client/server products and vendors with more traditional host-based solutions beginning to develop or deploy client/server solutions. In this volatile marketplace, one strategy some institutions are employing is to take a "hedge" position by acquiring only those client/server system components that are most mature and deferring a major portion of the system replacement until the technology is more proven.

Finally, many institutions are beginning to consider using the World Wide Web as an interface to data in secured administrative databases. The Web reduces or eliminates many of the complexities associated with distributing information and analytical functionality to different hardware and software platforms and, therefore, is likely to play an important role in the emerging institution-wide information technology architecture. Some technologists are beginning to predict that emerging Web-based tools will facilitate development of applications to the extent that the future will be one of "network-centric," rather than "desktop-centric," architectures.[5] The steering committee should seek to understand and convey the potential role to be played by the World Wide Web in administrative applications in the future.

Transaction processing versus decision support. Another tradeoff consideration the steering committee may deal with is in the area of creation, management, and use of financial information versus the processing of financial transactions. In many cases, the chief driver of change is the lack of timely, reliable, and/or comprehensible information for governing board members and institutional decision-makers, rather than failing transaction processing systems. While on occasion such a problem necessitates the renewal of the institutional chart of accounts and ledger, in other cases the problem can be addressed more easily and cost effectively through creating a data warehouse and deploying online analytical processing (OLAP) tools.

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[5] Jim Flynn and Bill Clarke, "How JAVA Makes Network-centric Computing Real," *Datamation*, 1 March 1996 (available on the World Wide Web at http://www.datamation.com/PlugIn/issues/1996/march1/03ajava6.html).

This steering committee recommendation has significant implications — financial and otherwise — for the project and can be framed as an "either-or" decision, or as a phasing decision. Many colleges and universities have met their decision-support requirements through these approaches at relatively low costs, earning valuable credibility and time for the more costly and complex replacement of the underlying transaction-processing systems. A decision to place priority effort on solving the problem of information access and presentation also allows time for marketplace solutions using newer technologies to mature and gain acceptance.

Best-of-class versus integrated solution. Another tradeoff decision is whether to seek the best solution for the financial system as a stand-alone application or to seek a solution that is part of an integrated set of systems. As mentioned earlier, while integrated systems can reduce training expenses and improve system outputs from the end users' viewpoint, the higher the degree of application integration, the lower the flexibility of any single component.

This tradeoff need not be made within the context of total application integration versus no integration. There are many stakeholders for the financial system and there may be a significant focus on business process reengineering, so some level of integration with other stakeholder systems may be inevitable. The design of the application interfaces to achieve integration, particularly of database information, may be an alternative to total application integration.

The decision about the degree of desired integration between elements of the financial system and other information systems will have a significant impact on the scope and nature of the project. For example, an institution that is seeking a high degree of integration, but has a low-to-moderate tolerance for taking risks, is likely to seek a solution of purchasing mature, off-the-shelf product suites. Such solutions may have shorter useful lives, unless the vendor is committed to migrating its products to emerging technological tools and environments.

Signature control versus post-audit accountability. The steering committee's principles and vision should strive to capture the institution's existing and emerging philosophy of internal control. Many older financial systems are built around internal control procedures that assume the existence of forms that must be signed and countersigned. These forms and signatures were designed to prevent unauthorized transactions from occurring at the source, but degrade general performance, since 100 percent of the controlled activities are regulated to prevent those few transactions that may be in error.

Many institutions are working toward eliminating forms-based/signature-based transaction controls in favor of new analytical tools for reviewing transaction quality on a statistical basis, after the fact. This approach improves the speed and user satisfaction of financial transactions, but may pose higher risks of errant transactions. Again, each institution will apply a unique set of values and priorities in weighing the tradeoffs between risk management, localization of authority, cost, and service quality.

Understanding the build-buy-partner options

One of the final tasks for the steering committee is establishing a general framework that will help the institution formulate a strategy for acquiring a new financial system, that is, whether the institution should buy an off-the-shelf vendor product, build or migrate systems in-house, or partner to build a new system with a vendor and/or institutional partners.

As part of this activity, the committee or an ad hoc subcommittee will want to do a quick scan of the commercial marketplace as well as "best practices" at peer institutions to identify viable solutions that could be evaluated in more depth later. (A note of caution here: the steering committee or subcommittee undertaking these external scans must be careful not to investigate these potential solutions to the extent of product demonstrations or campus visits; not only is the level of detail inappropriate in this strategic planning phase, it also opens the door to committing to a solution before requirements have been fully articulated by later project teams.)

The steering committee cannot, at this early juncture, make a final decision regarding whether the institution should buy, develop, or partner to develop a financial system solution. The committee can, however, simplify the downstream analysis and decision-making by providing an overall strategic direction in this regard to guide the work of the project teams and to be validated or revisited later in

Table 4:
Model for contracting services

		ASSET / SERVICE / ACTIVITY CHARACTERISTICS		
FREQUENCY		Nonspecific	Mixed	Idiosyncratic
	Occasional	Use Commercial Provider	Contracts	Contracts
	Recurrent	Use Commercial Provider	Joint Ventures, Affiliation Agreements, etc.	Perform Internally

the selection process after business processes and the technology environment have been evaluated, requirements have been articulated, and potential external solutions have been carefully investigated.

At the steering committee level, the build-buy-partner decision is a function of: (1) the institution's culture, (2) initial scope (incrementalism versus fundamental change), (3) technical capabilities, and (4) project resources.

In many ways the cultural decision driver is the key one. Many institutions have a tradition of maintaining highly integrated, vendor-developed packages and have well-founded fears of developing core institutional applications on their own. Similarly, many institutions believe that their size, complexity, and uniqueness preclude the implementation of an off-the-shelf solution. These institutions often have large technology development organizations and take pride in a "built-here"culture.

Another important aspect of culture is the set of values and norms surrounding teamwork at the institution, the prevailing attitudes about vendors, and what might be called the "culture of deadlines." The management of strategic partnerships is not a trivial undertaking and the steering committee should evaluate the campus readiness to engage in significant partnership activity, including identifying the barriers to creating successful partnerships with industry and/or with other institutions.

The decision to engage in business process redesign also will affect the build-buy-partner decision. A mandate from the steering committee to engage in a major rethinking of core financial practices should be accompanied by the realistic expectation that it may take an in-house development or partnership with a vendor to build a system that can support uniquely redesigned business processes. Similarly, a decision to encourage fundamental change in combination with a strong bias for an off-the-shelf solution must be accompanied by a realistic understanding that with such an approach, the change in business processes will necessarily be driven by the commercial solution. For some institutions, adopting the business process changes mandated by a commercial process may enable a rapid leap forward in functionality, even though that functionality has not been designated by an institutional process reengineering effort. In either case, it will be important for the steering committee to communicate the chosen strategy to help manage project expectations.

One strategic model, developed by UC Berkeley economist Oliver Williamson (see Table 4), looks at two primary variables: the specificity of the product or solution sought and the frequency of its use.[6] Using guidance such as this, an institution that is willing to adjust its operations to fit an existing software solution might be advised to use the commercial market in this way. If the system requirements are highly unusual, the institution might be advised to build a custom solution. Where moderate customization is sought but tradeoffs are possible, joint ventures or other contractual arrangements may make sense.

Another approach to the strategic view of the build-buy-partner assessment includes charting the institution's complexity along the dimensions of size and diversity (which will influence how complex the system needs are), as well as along the dimensions of the availability of and willingness to commit human, technological, and financial resources. For example:

- A small, single-campus institution with a tightly focused mission (e.g., religious or vocational education), relatively few administrative stakeholders, and few if any resources for internal development may accommodate a more centralized financial systems approach that would make it possible and probably desirable to consider the selection of packaged software with little customization.
- A large public research university with multiple internal and external layers of accountability and a heterogeneous technical installed base of computers may require localized and distributed solutions that

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[6] Oliver Williamson, "Transaction Cost Economics: The Governance of Contractural Relations," *Journal of Law and Economics* 22 (1979): 233-261.

do not yet exist, without substantial customization, in today's marketplace; such institutions may well have the resources to consider building systems in-house or with external partners to achieve their special needs.

Another critical factor — raised earlier in the steering committee's evaluations — that will bear heavily on the acquisition strategy is how urgent the need is for the new system(s) and thus how quickly the solution needs to be and can be implemented.

Most institutions today would agree that a buy option is a very desirable outcome, both initially and over time — provided that the product meets the functional needs at an acceptable level and cost. The advantages of a supported product or having other institutions using the same product as yours, with the attendant user-group leverage on a vendor, are compelling. However, it is also clear that this option is not always workable for an institution, so the other choices need to be explored as well.

At this point in their process, the steering committee can probably make a good estimation as to whether resources, time constraints, and other factors preclude in-house development or entering into an intensive external development partnership. In this case, such a strategy must be stated at the very outset of the project, to avoid raising expectations that all needs identified in the requirements definition phase will necessarily be met through an existing vendor product.

Communicating Directions: The Steering Committee's Report

The communication of project directions and findings is a complex activity that demands the participation of all those involved in the project. There are no clear guidelines that determine who in the project should handle what project communications. In general, the steering committee is most effectively used in situations where high-level organizational placement is most advantageous; steering committee members should expect to handle communications that address high-level political concerns, while issues of technical complexity and business requirements are more appropriately communicated by follow-on project teams.

Large, complex institutions might find that the amount of effort needed to communicate findings and directions to campus constituents requires the formation of a steering committee communications subcommittee. As shown in Figure 1, this subcommittee ideally would receive direction from both the steering committee and the project management team. Membership of this group might include representatives from the campus communications/public relations office, academic business officers, information technology department, accounting office, project management team, and steering committee. While the steering committee will be involved in communicating directly with campus decision-makers, this subcommittee might map out a detailed communications plan and timetable that is geared to all customers and stakeholders.

The planning process that the steering committee members have gone through, when successful, serves to create an important level of congruence of views among its members. It is a mistake to assume that this commonality of thinking and viewpoint is widely understood or shared at the institution. Thus the steering committee's findings and recommended directions should be summarized in the form of a written report to the senior executive committee or president's cabinet, as well as for broad distribution across the institution.

The length and style of such a report will vary according to the taste of the project leaders and to the dictates of the prevailing institutional culture. The effectiveness of this report — and the associated institution-wide communication effort — depends on: (1) making the report as readable and intellectually accessible as possible, (2) providing the context for policy alternatives selected and actions recommended, and (3) clarifying the tradeoffs that are suggested or implied in the steering committee's recommendations.

The steering committee's report will set the tone for the project ahead, will establish the case for action, and will provide the initial scoping boundaries for the project and system. The roles to be played by this report and by the supporting communications efforts will be essential to the establishment of broad support for the project and for managing initial expectations about the functionality expected from the new business processes, systems, and capabilities.

Elements of the steering committee report should include the following:

Membership Roster: a listing of the steering committee's membership, to signal the breadth and nature of institution-wide involvement in and support for the planning process and the project.

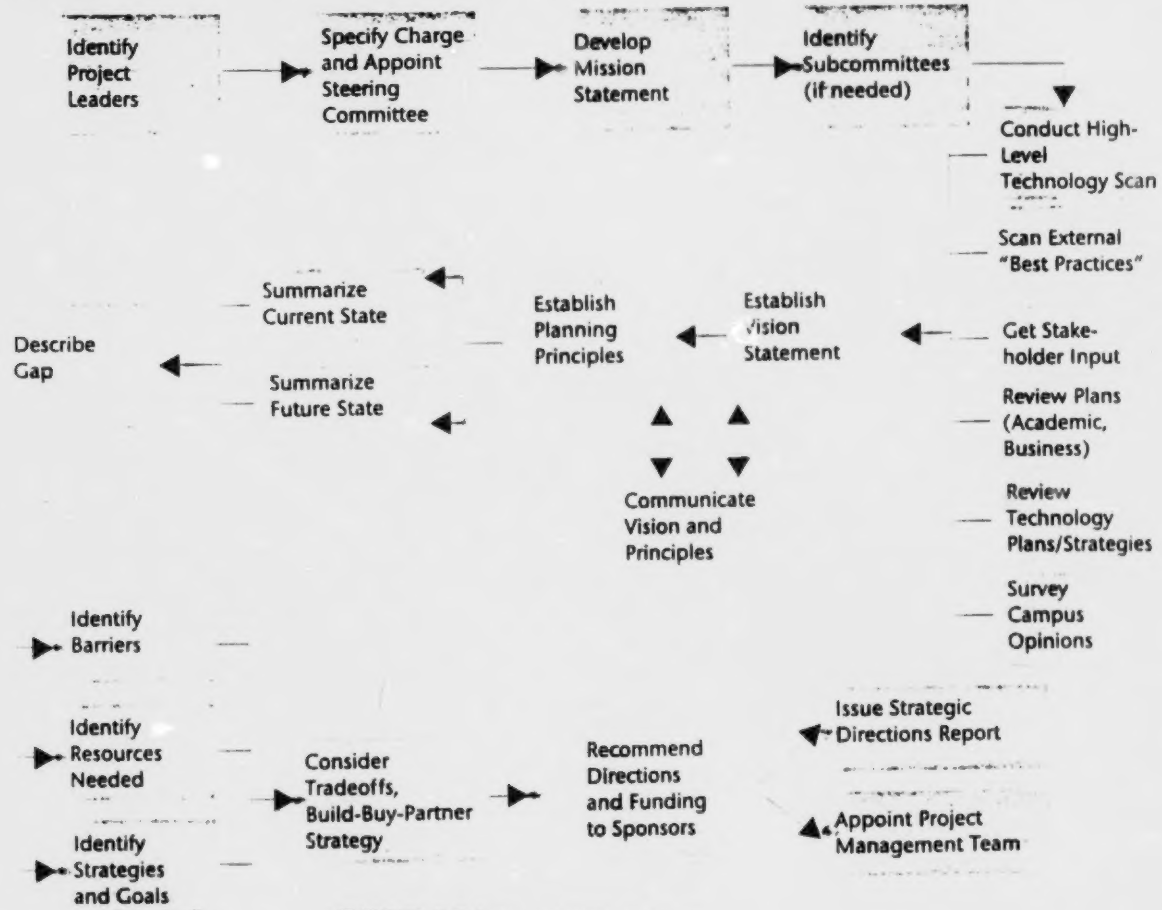
Executive Summary: a summary of the committee's charge, key findings, and primary recommendations.

Context: the committee's primary observations about the major influences that will drive both the need for change and the specific goals, strategies, and priorities that are made later in the report. Contextual drivers of change can include changes in academic priorities, funding shifts, control weaknesses, new institutional leadership, technological opportunities, new reporting requirements, and/or others. The state of the existing financial information system can be described here, as well.

Vision Statement: a clear, compelling, and succinct statement of vision that frames the priorities of the upcoming effort in a way that any reader will understand. Wherever possible, the vision statement should strive to create enthusiasm, while avoiding ambiguous concepts and jargon.

Statement of Principles and Goals: a summary of the principles and goals that are expected to guide the decisions, choices, investments, and priorities of both the project and the financial and information technology environments. As with the vision statement, the principles must be clear, precise, and free from jargon. Meaningful and clear design principles and goals provide the basis for downstream project architects and decision-makers to evaluate decisions and project outcomes and guide fundamental scoping issues in the project. For example, a principle regarding the "openness" of financial information will influence the range of

Figure 3: Process flow chart for planning phase


Identify Project Leaders
Specify Charge and Appoint Steering Committee
Develop Mission Statement
Identify Subcommittees (if needed)
Conduct High-Level Technology Scan
Scan External "Best Practices"
Get Stake-holder Input
Review Plans (Academic, Business)
Review Technology Plans/Strategies
Survey Campus Opinions
Establish Vision Statement
Establish Planning Principles
Communicate Vision and Principles
Summarize Current State
Summarize Future State
Describe Gap
Identify Barriers
Identify Resources Needed
Identify Strategies and Goals
Consider Tradeoffs, Build-Buy-Partner Strategy
Recommend Directions and Funding to Sponsors
Issue Strategic Directions Report
Appoint Project Management Team

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Critical Success Factors:

- ✓ Engaging key stakeholders in leadership roles
- ✓ Capturing stakeholder input campuswide
- ✓ Developing a sound business case for change to ensure buy-in
- ✓ Assessing realistically the cultural readiness for change
- ✓ Articulating current financial model and envisioning future model
- ✓ Communicating effectively the vision, strategies, and goals to set expectations
- ✓ Assessing realistically the resources that will be required
- ✓ Assessing realistically the gaps that will need to be overcome

Land Mines:

- ✓ Funding not clearly committed
- ✓ Lack of executive support or understanding
- ✓ Assuming buy-in because of dissatisfaction with status quo
- ✓ Underestimating resistance to change
- ✓ Getting into too much detail in the strategic overview phase
- ✓ Abandoning academic vision exercise because of a lack of an academic plan
- ✓ Establishing a vision that exceeds the ability of the institution to achieve it
- ✓ Failing to include life-cycle costs in the resources assessment
- ✓ Establishing unrealistic timelines and cost estimates

security alternatives explored in the project. Decisions about the build-buy-partner continuum may also be established as a matter of principle, or may be stated in the final recommendations section.

Readiness for Change: a summary of the results of the steering committee's assessment of technical, operational, cultural, and other barriers to achieving the vision. The assessment of barriers, wherever possible, should be supported by survey results, summaries of focus group meetings, and other tangible efforts, since reducing or eliminating such barriers will often drive many of the less obvious costs of the projects. For example, a decision to distribute an electronic supply catalog to support online purchases assumes at least: (1) a robust network, (2) a contemporary desktop computing environment, and (3) a commitment to either institution-wide training or the creation of intuitive systems with state-of-the-art help features.

This section of the report can bring together the information about the hopes and expectations of different members of the campus community, the state of the existing environment, a statement of project priorities, and a size-of-the-ballpark estimate of the costs of closing the gap between the "as is" and the "to be" environments.

Tradeoffs: a summary of the tradeoffs that have been considered with a description of the process by which the decision framework was established. Colleges and universities are organizations in which nearly all citizens have a right to vote whether or not they hold a stake in the election. In other words, the report of the steering committee, in general, needs to convey not only the worthiness of the committee's conclusions concerning potential tradeoffs, but the rigor of its underlying analysis.

Recommendations: a summary of key recommendations or strategies that the steering committee has decided to put forth. These recommendations, wherever possible, should be clear and concise, and should specify to whom the recommendation is made, and by when a recommended decision or action should be made or taken.

To prepare the ground for project funding approval, leadership support, and broader institution-wide participation in the project ahead, key members of the steering committee should distribute the report broadly and should plan a question and answer session open to all members of the campus community to introduce the steering committee's thinking and to refine that thinking further. The completion of the report and subsequent communication activity is a key milestone and marks the end of the first phase of the project.

Chapter III Overview

- **Appointing the Project Management Team**
- **Using Partnerships to Achieve Buy-In**
- **Determining the Scope of the Project**
- **Establishing a Project Plan**
- **Employing Good Management Strategies**

"... the costs of introducing new technologies to support the old way of doing business — 'paving cowpaths' — can be both the inflexibility of the resulting system and the suboptimization of the resulting processes."

III: Structuring and Managing the Project

Assuming that the business case for action and the recommended directions for the project have been approved by campus executives, the steering committee must next appoint a project manager and project management team. The role of these individuals is to:

- structure and manage the project;
- develop project budgets, schedules, and key milestones;
- oversee the business needs identification process;
- oversee the technology evaluation process;
- develop a requirements document and seek a solution;
- recommend a financial systems solution that will be congruent with both the campus vision and the articulated requirements; and
- oversee the acquisition and implementation of the solution.

Appointing the Project Management Team

Financial systems projects can be managed successfully from nearly any organizational platform — information technology, administration, finance, budget. What is critical is that the project manager be an individual who has the confidence and respect of the leadership of these organizations, credibility within the institution, strong people skills, and the ability to navigate, integrate, and communicate the broad interests of the campus stakeholders in the planned system. In the ideal situation, the project manager will emerge from the ranks of the steering committee members so as to ensure continuity of thought between the early steering group planning activities and the downstream work of the project management team. If this cannot be the case, the project manager must be made an ex-officio member of the steering committee once he or she has been named.

In addition to a variety of technical and/or application/functional skills, communication ability, and project management skills and experience, the project manager must possess the judgment and political acumen to understand the key turning points of the project and to invoke the aid of the steering committee and various project teams at appropriate times.

In general, the project manager will rely on the steering committee to garner resource support and to retain the support of the institutional leadership for the project. Similarly, this manager will need to work with a project management team to formulate, ratify, communicate, and support important decisions of a primarily business process and technical nature throughout the course of the project. In general, the steering committee most effectively will act in situations where there are high-level political concerns, while issues related to technical and business requirements will be more appropriately evaluated by the project management team (see Table 5).

The project management team will have overall responsibility for the success of the financial systems project, from planning through implementation. Thus, members of this team should be selected for their interest in and commitment to the goals of the project and should represent a broad cross-section of the campus community. Whenever possible, members of this team should include individuals whose opinions are frequently consulted at the institution, whether or not such individuals are known to be supporters of the central financial or technology offices.

The collective credibility of the members of the project management team will have a considerable influence on the project's eventual outcome. Particularly in smaller organizations, it is likely that

Table 5: A model for guiding intervention and communication

	Political Complexity	
Technical Complexity	**LOW**	**HIGH**
HIGH	Project Management Team	Steering Committee and Project Management Team
LOW	Project Management Team	Steering Committee

the members of the project management team will also be involved in the implementation process. Indeed, the same group of people may make up the core of several different functional teams, such as the project management, some of the business process review teams, the technology evaluation team, and the implementation teams. Note that all of these teams do not necessarily need to be created as separate entities, but all of the *functions* ascribed to the teams suggested must be achieved in order to have a successful project. (Figure 1 on page 11 provides an overall view of project roles and structure, while Table 6 on the opposite page lists the functions of the suggested teams.)

The effectiveness of the project management team will be the decisive factor in the success of the project, and thus the roles and responsibilities of this group must be made clear from the start. Everyone who is engaged on the project management team must be a contributing member who is able to bring his or her own departmental expertise and allegiances to the table, while also being able to integrate those needs with the larger institutional vision spelled out by the steering committee. Team members must be given enough time away from their primary responsibilities to perform appropriately in these roles, and must have the support of their management in this participation. Such support could perhaps include rewards for participation, but at the least must include an acknowledgment of the burden imposed by this additional task and the importance of some redistribution of ongoing responsibilities.

Examples of typical members of the project management team might include key consumers of financial services (major academic departments, separate schools, divisions) as well as consumers of financial data (institutional research, budget office), representatives from key parts of the financial organization (internal audit, payroll, capital projects, purchasing), and staff from the technology organization who are knowledgeable about the institution's financial systems. Staff and user training are too often not addressed early enough in the project, so having the person who will later function as training coordinator serve as a member of the project team will help the team focus on strategies to meet training needs. Ideally, the "core" standing project management team should be kept to eight to ten people to facilitate frequent and constructive discussions; however, it is more important to ensure adequate representation for input and buy-in than to limit the size of this team, so a larger team may be necessary.

The project manager must be able to work with the variety of individuals represented on the team in order to move the group toward accomplishing its common goal, taking maximum advantage of the skills of each individual member of the team and helping each member contribute all that he or she can toward achieving the project ends. At the same time, sensitivity to the team's needs for support, guidance, and refreshment is also required, so that burnout does not occur before success.

Throughout the process, the project management team will report back to the steering commit-

Table 6: Overall project structure and responsibilities

Steering Committee (accountable to project sponsors)
- Communicate with the campus community and achieve widespread buy-in
- Establish a business case, vision, and planning principles
- Develop a decision framework
- Issue a report recommending project scope, goals, and strategies
- Appoint a project manager and management team
- Approve project plans, budgets, deliverables, and schedules
- Approve solution proposed by the project management team
- Function in an advisory capacity through implementation

Project Manager (accountable to steering committee)
- Provide project leadership
- Structure and define the project
- Develop a project plan, including budgets and schedules
- Monitor budgets and schedules throughout the project
- Promote campuswide partnerships
- Oversee various project teams, promoting project buy-in
- Serve as liaison between project teams and steering committee
- Report project progress periodically to steering committee
- Resolve conflicts that may arise among project constituencies

Business Process Evaluation Teams
(accountable to project manager)
- Map and evaluate existing business processes
- Recommend alternative processes
- Align recommendations with steering committee's strategic directions
- Collaborate with technology team to ensure alignment of business process recommendations with technology considerations

Technology Evaluation Team
(accountable to project manager)
- Assess the technological scope of the project
- Raise technology awareness
- Identify technology alternatives
- Review commercial marketplace and scan higher education practices
- Document existing and planned campus technology environment
- Collaborate with business teams to ensure alignment of technology recommendations with business needs

Project Management Team (accountable to project manager)
- Conduct business process evaluations (or oversee teams appointed to do this)
- Conduct a technology evaluation (or oversee a team appointed to do this)
- Align business process needs and technology options
- Communicate expected outcomes to campus community
- Develop requirements document and issue request for information (RFI)
- Validate RFI responses against requirements
- Evaluate and recommend buy, build, or partner options
- Select a solution (or oversee a team appointed to do this)
- Recommend solution, final budget, and schedule to steering committee
- Implement the system (or oversee teams appointed to do this)

Selection Team
(accountable to project manager)
- Issue a request for proposals (RFP)
- Develop an evaluation and measurement system
- Evaluate vendors and the content of their proposals
- Recommend the solution to the project management team
- Develop and finalize contract with selected supplier

Implementation Teams (accountable to project manager)

System Integration Team
- Technically integrate the new FIS with the existing legacy systems
- Set up the version control process for the new system
- Establish the software enhancement process to be followed over time
- Set up ongoing production control process for daily processing of the system

Technical Support Team
- Train departmental technical support staff
- Establish the workstation configuration (if a client-server system)
- Establish network connectivity for all users
- Coordinate the network configuration for each department

Documentation Team
- Produce and/or distribute user documentation
- Produce system documentation for production control
- Develop, produce, and distribute training materials (in conjunction with training team)

Training Team
- Handle training logistics, such as scheduling, equipment, and facilities
- Develop, produce, and distribute training materials (in conjunction with documentation team)
- Coordinate users groups and help desk functions

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tee, to ensure that its work is continuing to meet the institutional needs and goals that were initially articulated. In addition, these periodic reviews will give the steering committee an opportunity to reshape or redirect the project, should needs shift.

In addition, the project manager – in concert with the project leaders – will have to align and integrate the disparate and complex elements of the project by managing the composition of and appointments and charges to the various additional teams or subsets of project team members that will need to be appointed throughout the project. The membership of these teams needs to be flexible, and in many cases the same individuals will have a role to play on several of the teams. Having some duplication of team membership can improve alignment of action and intent throughout the project. It is particularly helpful when selected steering committee members serve on appropriate project teams.

It is important also to ensure that the roles of the various teams are well understood and that reporting and communication lines are clearly delineated so that each major component of the project is appropriately managed and staffed. The work of the teams needs to move forward in a synchronized way; several of the teams may be working at the same time, and information must pass between them efficiently.

Using Partnerships to Achieve Buy-in

The reality of financial systems in complex organizations today is that they serve many users, and are major tools in accomplishing many important tasks for the institution. As such, any project that will make significant changes in these tools needs continually, throughout the project, to promote a sense of "ownership" of that change across the institution. In addition, as the use and management of information become more decentralized across the institution, there are many different users who have knowledge to contribute to the project. Their expertise can be tapped, and their involvement and buy-in ensured, by creating a series of partnerships through the various additional teams that will be appointed throughout the project, building on the cross-institutional representation of the steering committee and project management team.

Depending on your institution's culture, ideally the chief financial officer (CFO) or chief budget officer (CBO) will enjoy a good working relationship with the chief information technology (IT) officer. The roles of these different players, and the extent to which the CFO/CBO will influence technology decisions, will be determined by the culture of your business/finance group. The financial organization will clearly have a project ownership role, and the project manager may want to encourage the CFO to play a strong role in the technological discussions, as well.

In a situation where the CFO or CBO is involved in the technology strategy, this participation can have significant influence over the strategic direction of the project, particularly in the areas of development philosophy and distributed processing. Based on experience or vision, he or she may incline toward the purchase of applications from outside vendors, or the use of external development alone or in a partnership structure, in an effort to reduce dependence on the information technology organization over the longer term. Alternatively, he or she may prefer an internally developed solution, so that the core financial processes of the organization can continue in as similar a manner as possible to current practice. From the perspective of the CFO, issues such as the ongoing support model for the financial organization, and the process used in developing the business requirements for any technological solution, will be key.

Whatever the particular mix of participation, such a high-level "partnership" between the financial management group and the information technology organization will go a long way toward cementing the change process and marshalling the necessary resources to successfully complete the project. Fostering this particular partnership will also help to avoid a major project land mine – the failure of technical staff and business staff to agree on the requirements of the specified system.

Without this understanding, the project goals cannot be defined in a way that will be seen as meeting "institutional" needs, since different parts of the institution will be perceiving the needs differently, thus preventing effective evaluation of available tools, setting of project goals and milestones, and clear and consistent definition of needs for vendors (when external solutions are sought). This potential land mine can best be managed by providing as much education as possible for all interested parties on campus, so that the understanding of what already is being done, what changes are to be introduced, and what tools are available to introduce that change are not pieces of information held by only one or two groups, but fashioned by all members of the various teams working together in appropriate partnerships.

Using these partnerships effectively is a key to the success of the project, whether they are between technologists and end users, the chief information technology officer and the CFO, technologists who are focused on client/server-based implementation strategies and those who are more oriented toward mainframe applications, those who benefit from transaction processing systems and those who are more concerned with reporting and manipulation of data, or within staffs of different end-user departments. All of these partnerships will need to be strengthened and refined as the project moves forward.

Determining the Scope of the Project

Two fundamental issues to consider when acquiring or developing any automated system, especially a financial system, are: (1) the importance of recognizing that technology should not drive the systems acquisition process, but should be viewed as secondary to the actual business processes that it will support; and (2) the importance of ensuring that the institutional business processes and practices are as efficient and effective as possible.

Depending upon the principles established by the steering committee and the directions that group has set, the project management team will need to choose an approach to identifying business requirements for new or enhanced systems. In the traditional method of business requirements determination, the existing business functions are analyzed and the specific needs of each application are documented as requirements.

An increasingly popular approach, arising from continuous improvement or quality management concepts, is to review existing business processes prior to defining business requirements. These reviews often include participation from cross-functional teams and identify possible significant improvements in existing processes that might reflect cost containment, additional services, or more efficiency or effectiveness. Depending on the thoroughness of these reviews, the overall process of change can be slowed down by process reengineering efforts; for institutions intending a significant paradigm shift, the longer lead time required for these detailed reviews is a cost to consider. Regardless of the level of effort devoted to these reviews, the technological evaluation will need to take into consideration these newly defined needs.

Clearly, not every institution will be able to or need to conduct extensive business process reviews. If, for example, the steering committee vision process has resulted in a strategy that would point toward purchasing an off-the-shelf system, such a purchased system may not be able to provide the highly customized functional features that are likely to be specified in a process evaluation exercise. In fact, to fully leverage a vendor product, it is often necessary to adapt business processes to fit the product. Like the steering committee, the project management team must recognize this at the outset and make sure that any process evaluation is conducted with appropriate expectations, that is, understanding that not all sought-after functionality may be possible with a purchased solution, and, in fact, that business process change will likely be influenced by the nature of the selected product.

Even when major process changes are not anticipated, it is nonetheless valuable to engage in some business process evaluation while taking a more traditional approach to identifying required functionality. Clearly, the business process evaluation effort, which will prompt broader recommendations than simply the use of new technical tools, will not be solely dependent on eventual responses to a request for proposals for the implementation of changes. Indeed, some of the recommendations for process change can often be introduced before any other significant changes are made, producing the "quick wins" that enable customers to believe that the project will, over time, make significant changes for the institution. The project management team can be working with the appropriate managers and offices to introduce such non-technology-driven changes, regardless of the outcome of the systems project.

In deciding what approach to take to identify business requirements, the institution's leadership must be aware that the costs of introducing new technologies to support the old way of doing business – "paving cowpaths" – can include both the inflexibility of the resulting system and the suboptimization of the resulting processes. Opportunities for introducing institutional change of the scope required by migrating or replacing financial systems, as well as by making financial business process changes, are not frequent. Attempting to do one, and then returning later for the other, may require more upheaval than the campus can tolerate.

Establishing a Project Plan

Before proceeding with the actual formation of additional teams, the project management team will need to establish an initial project plan, made up of a preliminary timeline and an initial estimate of resources needed for the project. Creating such a plan will provide a sense of the resource commitment that will be necessary to accomplish the steering committee's goals in a reasonable time. The initial project plan will then need to be presented to the steering committee for its approval.

In pulling together this project plan, the team will have an opportunity to further define the project. Important questions to answer will include who really "owns" the project, and who really "funds" the project. If the functional office (through the CFO and/or CBO) assumes primary ownership, the value of technical expertise may be underestimated, but the enhanced buy-in from end users will be valuable in achieving success; if the technology office takes primary ownership, project management skills may be stronger and the technical issues will be well addressed, but there can be a cost in achieving an appropriate functional focus. In designing the funding strategies, user-funded projects can produce high acceptance of the importance of the project, joint funding can produce some conflict over priorities, and core funding can produce concerns for control of costs. All of the funding and ownership models can be successes or failures, depending on how they are articulated and managed, and how they conform to the institutional culture.

The preliminary project timeline should reflect the major phases of the project (conducting business process and technology reviews, generating a requirements document, issuing a request for information/request for proposals, selecting a solution, and implementing the system), and indicate which phases can run in concert and which are "gating" items for future steps, with rough estimates of the amount of time necessary for each. These time estimates should incorporate the assumptions about available resources included in that part of the plan.

The resources plan, which will of necessity be a rough approximation of anticipated needs, should reflect both one-time expenses (such as initial hardware and software purchases) and the ongoing costs (such as maintenance, training, and eventual equipment replacement). As mentioned earlier, training, in particular, is an area too often overlooked in the cost analysis. The plan needs to address how it will be funded initially, how long it will be necessary to offer training, and what kind of resources will be needed to support maintenance of the training function.

The costs of the project need to be broadly articulated for the entire institution, so that personnel impacts from across the institution are included, as well as other resource allocation choices such as assignment of space. If systems will be running in parallel for some period of time, the cost of supporting both systems will need to be reflected. Likewise, if part of the project strategy is to distribute work flows in a more decentralized way, any burden of that "incremental" work on the decentralized units needs to be reflected in the project's resource plan.

The resource planning should also reflect realistic assessments of the project benefits, to manage the full impact of the project. There may be benefits from the project that are seen as key but that are without direct budgetary impact (for example, increased quality of service to customers); for these benefits, appropriate indicators of success (customer survey responses, reduced number of complaints, decreased cycle times) should be established at the outset, to provide a matrix within which the team can report on progress toward goals.

The resource allocation choices in support of the project need to be made and managed within the context of a set of outcomes and an assumption about timing of milestones. If changing institutional priorities require that the resources available be reduced, the project team must define a reduced set of goals, or set a longer time frame for the achievement of the goals, or perhaps a little of each. These revisions to the context of the project must be seen as part of a cohesive whole, so that those who are relying on the outcome of the project have a continuing, realistic understanding of what will happen and when and with what degree of support.

Clearly stating this set of assumptions at the outset will help to avoid a significant project land mine, that of embarking on the project with an unrealistic assessment of the formula, "resources plus time equals outcomes." Underestimating (or not fully reflecting) the resources or the time necessary to achieve the agreed-upon outcomes will, without exception, produce a project that is unrealistic to complete, and will at best put the project owners in the position of constantly managing immense frustration and unplanned resource reallocation in order to achieve a reasonable outcome. At worst, the project will be brought to a halt over the inability of project management to meet the agreed-upon goals with the agreed-upon resources.

This risk must be managed through a variety of strategies:

- establishing a project plan with resource requirements tied to particular project goals, so that as time passes and money is spent, if the goals are not being met, there is an obvious indicator that the estimates are not realistic;
- studying general project management information that provides strategies on how to estimate and manage resources for projects of this type;
- conferring with other institutions that have embarked on similar projects and talking to vendors, to get as realistic an assessment of the resource needs as possible; and
- reviewing the history of the institution in managing similar projects in the past, including the level of commitment that has continued over time and the quality of the initial estimates compared to final experiences.

In planning funding for the project, it is important to include the impact of any financing strategy on the project outcome — if funding sources are going to be available over time, the major expense components of the project must parallel these funding streams, or temporary funding sources must be identified at the outset. Establishing the major milestones of the project, both with absolute dates and as they are tied to other earlier deadlines, will allow the community to incorporate the project work into other institutional priorities.

Employing Good Management Strategies

Whatever approach is taken in identifying requirements and establishing business needs, there are a number of good project management strategies that are especially critical in a campus financial systems project and that need to be employed throughout the life of the project. These include teamwork/team building strategies, communication strategies, strategies for resolving differences, change management strategies, progress management strategies, and strategies for managing expectations.

Teamwork/team-building strategies

As pointed out in earlier chapters, creating and using teams of people to accomplish the institution's goals is a critical success factor for any systems project. The effective use of teams requires a set of skills on the part of the project manager/team leader, as well as each member of the team. The project manager, or leader of any of the individual additional teams, will be called upon to facilitate discussions and help the group move toward consensus; to establish clear goals for the group, and provide a role for each member that takes maximum advantage of his or her skills in the team's area of responsibility; to provide structure for team meetings, including an agenda for the meeting and clear starting and ending times; to set a tone for the discussion that allows participation from all members of the group; and to summarize the work of the group in order to provide information to other teams as well as to the larger campus community.

Each individual team member must bring a willingness to participate in a group setting, and to respect and participate with the other members of the group; an ability to represent his or her particular area of expertise, while also keeping the steering committee's larger institutional vision in mind; an endorsement from his or her supervisor of the importance of the team's work, so that appropriate amounts of time and energy can be devoted to the group by all team members; and a level of knowledge and expertise about the project at hand, or the willingness to become better informed by pursuing additional information as necessary.

Understanding how to work on a team is of such importance that it is worth considering providing the opportunity for team members to do formal team training. At the University of Idaho, for example, information systems staff learned team skills by completing two twelve-week team-training courses through distance education from the National Technological University. The skills they developed helped them when they later used teams to implement several modules of an integrated information systems package. At the University of Michigan, the information technology organization has identified a staff function called Professional Development Managers; these individuals work with technology staff on an ongoing basis to help them develop teamwork and communication skills.

Communication strategy

Involving institutional players in the teamwork effort means being sure that good information, and complete information, is being shared often and well with all interested parties at the institution. Ensuring that all constituencies hear about the project, in ways that are tailored to their involvement with the outcome, is a critical success factor. The project team must understand the difference between information sharing with all parts of the institution and project management reporting for those who have a direct investment in the outcome and/or are involved in moving the project forward toward its goals. In particular, the project management team (or a subset of the team focused on communications) is responsible for ensuring appropriate levels of communication among the various teams who are involved in the project, so that business process teams, the technology evaluation team, and the steering committee are all connected to and informed about each other's work.

Unfortunately, part of any communication strategy must include dealing with complaints. They will happen, so having a thoughtful approach in place will solve problems more quickly when they arise. At Wayne County Community College, a financial systems implementation employed a "committee on gripes" to provide a special mechanism for complaints to keep these kinds of issues from taking up valuable project team meeting time. Many complaints can simply be forestalled by clear communication about the goals and timetable of the project from the start, so that at least confusion or lack of understanding are not significant factors. However, there will be some areas, offices, and individuals for whom the project does not have material advantages, and who will have criticisms of the methodology of management, the approaches, and so forth. It is important to take these risks into account at the start, and anticipate complaints so that reasonable responses can be made, especially as the stress of implementation approaches.

Strategy for resolving differences

As business processes and the underlying technology tools that support them become more decentralized, just as the "owners" and stakeholders of a financial system are spread throughout the institution, so too are the players who can effectively derail an implementation project.

Obstacles to the success of the project can arise both from the personal perspectives of the individuals involved and from their institutional responsibilities. For example, differences of perspective over security of data versus easy access to information, or decentralized processing of data versus centralized responsibility for the quality of that data, are perfectly reasonable given the variety of perspectives from which team members will be drawn.

Such fundamental differences can constitute a project land mine if the project team fails to ensure, first, that such differences are seen as differences only, not judgments of right and wrong, and, second, that there is a project framework in place that includes a mechanism for the resolution of such differences. This can be handled by the project management team itself, or referred to the steering committee or some other authorized body, but the mechanism must be easily accessible so that the resolution of these issues does not slow down the overall progress of the project.

Change management strategies

The project management team, and the project manager individually, will both be called upon by the force and scope of this project to represent and articulate the need for profound changes for the institution, by the very nature of replacing financial systems. Leading this effort will require a level of institutional credibility and respect for the individuals involved, constant communication with the stakeholders throughout the institution, and willingness to explore a variety of solutions in order to be able to clearly articulate the appropriateness of the final recommended solution.

In addition, all members of the project teams will need to be able to withstand pressures to slow down or derail the change process, as well as deal with attempts to change the project scope for political reasons or in reaction to a perceived crisis. Clearly the project manager and team members will need the support of the steering committee as they continue to pursue this high institutional priority.

Progress management strategies

To ensure that the project moves toward successful completion, the project manager will need to employ a variety of progress measures. These will include setting key milestones for the project (such as completion of the business process reviews or drafting of the request for information document), and then working with the specific teams to set more detailed task lists and deadlines for each area (for example, each business process review will have a set of tasks that must be completed to prepare the needs recommendations).

As outlined in the project plan, these milestones should be tied, whenever possible, to necessary resources, so that the project management can measure whether the resources devoted are producing the products required. The more such milestones with affiliated resources can be established at the outset, the easier it will be to diagnose if the project is not going to be able to meet its larger end goals, and to take corrective action well in advance of reaching such a crisis.

In addition, the project manager should be responsible for managing the project resources themselves, administering the staff and equipment budget, monitoring the expenditures of outside consultants, and working with the individual teams to ensure that their activities are funded and managed appropriately.

Finally, the project manager may wish to use outside parties to review the project's progress. In this case, the outside group or groups involved — probably from the institution's outside audit firm or technology consulting firm — should review the initial project plan to identify any problems as quickly as possible, as well as to help prepare interim reviews as the project moves forward. Such reviews may be formal visits to campus to meet with project teams, or may be done on a more informal basis by reviewing project notes and reports and talking to individual team members as necessary.

Management of expectations

A major critical success factor in managing the project is the effective management of expectations. This includes not only setting the expectations of those involved in the project to keep the project planning realistic and within achievable scope, but also setting the expectations of the broader campus community about the scope of the project and its resulting impact on the way the institution does business.

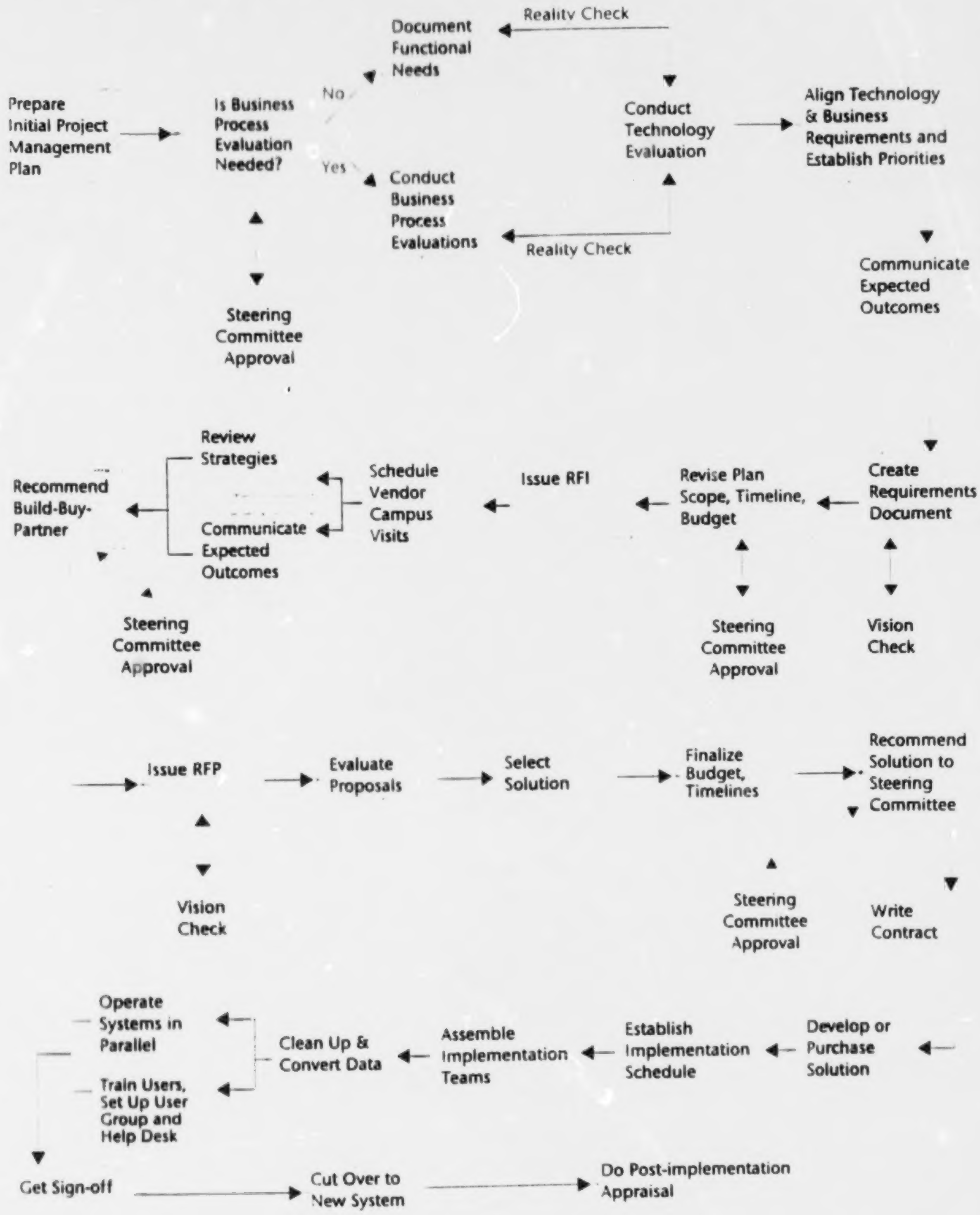
In defining the project scope at realistic levels, there will be constant pressures to expand the boundaries of the project, as each of the institutional areas with which the financial systems interact is analyzed and considered. While each of these expansion decisions will be perfectly defensible in its own right, the breadth of the project cannot be allowed to exceed a realistic scope for an institution that has many other competing claims on its energies. It will fall to the project manager to constantly exercise restraint in refining the project goals to keep them both complete and realistic.

In setting expectations, the whole institution will be affected to some extent; all of the members of the teams defined above will have at least some portion of their time consumed by this new endeavor, so some component of their existing work will either fall to other individuals, or not be performed as the institution has been expecting in the past. Ensuring that the campus community understands the longer-term advantages of the project and therefore can revise its near-term expectations will avoid burnout on the part of the team members, as well as disappointment on the part of the campus community about the inconveniences presented to their lives and work.

By raising the consciousness of players as to what is possible and desirable, and clarifying the difference between a wish list for "what technology could do" and a needs assessment for "what we are looking for in this implementation," the project management team can ensure that the particular project outcomes will be understood to match institutional requirements.

When all functionality cannot be met by the initial system implementation, expanding expectations or needs can be noted for possible attention in a subsequent, post-implementation phase. At some point, it may be possible to "grow" the new system to provide additional functionality; if so, keeping a

Figure 4: Process flow chart for project management — from project plan to implementation


Reality Check
Document Functional Needs
Prepare Initial Project Management Plan
Is Business Process Evaluation Needed?
No
Yes
Conduct Business Process Evaluations
Reality Check
Conduct Technology Evaluation
Align Technology & Business Requirements and Establish Priorities
Steering Committee Approval
Communicate Expected Outcomes
Create Requirements Document
Vision Check
Revise Plan Scope, Timeline, Budget
Steering Committee Approval
Issue RFI
Schedule Vendor Campus Visits
Review Strategies
Communicate Expected Outcomes
Recommend Build-Buy-Partner
Steering Committee Approval
Issue RFP
Vision Check
Evaluate Proposals
Select Solution
Finalize Budget, Timelines
Recommend Solution to Steering Committee
Steering Committee Approval
Write Contract
Develop or Purchase Solution
Establish Implementation Schedule
Assemble Implementation Teams
Clean Up & Convert Data
Operate Systems in Parallel
Train Users, Set Up User Group and Help Desk
Get Sign-off
Cut Over to New System
Do Post-implementation Appraisal

Critical Success Factors:

- ✓ Appointing the right project manager
- ✓ Appointing teams that foster partnership and collaboration, building on campus expertise and experience
- ✓ Clearly defining roles and responsibilities of all participants
- ✓ Establishing major project milestones with specific dates and resources required for completion
- ✓ Effectively managing expectations of project outcomes
- ✓ Keeping different groups within the community informed in ways that are meaningful to them
- ✓ Having a mechanism for resolving differences
- ✓ Containing the scope of the project to what can realistically be accomplished

Land Mines:

- ✓ Allowing the project scope to expand beyond capabilities to get the job done
- ✓ Failing to engage all key stakeholders appropriately
- ✓ Inability of team members to understand the institutional perspective
- ✓ Unrealistic expectations of the ease with which systems can be implemented
- ✓ Failing to understand that the system may not meet *all* needs
- ✓ Underestimating the resources and time needed to complete the project
- ✓ Allowing conflict to go unresolved, especially between the chief financial officer and the chief information technology officer

record of needs that could not be met in the initial implementation will provide a foundation upon which to build later. A note of caution: This should not be confused with an invitation to freely add new functionality to the selected system as it is implemented, but to note the potential for improvement when the opportunities arise at a later date.

One potential land mine for a project that has heavily engaged users of business processes to reevaluate those processes — and define their needs based on making major changes to those processes — is the potential that a product cannot be found in the marketplace that will provide the required functionality, yet the institution may not have the resources to develop the systems in-house. The project management team must take extra care in clearly communicating this possibility to business process teams, and emphasize the importance of their role in identifying "must have" functionality and prioritizing requirements so that the most critical functionality can be met with the initial implementation.

Chapter IV Overview

- **Structuring for Business and Technology Evaluations**
- **Evaluating Business Processes**
- **Evaluating the Technology Environment**
- **Identifying Disconnects and Proposing Alignments**
- **Creating a Requirements Document and Finalizing the Project Plan**

"... the technology team and business process team(s) should work in parallel, reviewing the recommended process changes against available technology tools, and revisiting both sets of information until the two visions can be aligned ..."

IV: Determining Business and Technology Requirements

The approach advanced in this book for determining business and technology requirements for a new or upgraded financial information system is to take the opportunity presented by the project to carefully evaluate your current business practices and processes in conjunction with investigating potential technical solutions. This is an excellent opportunity to introduce business process change as well as technology change at your institution.

Structuring for Business and Technology Evaluations

The most common structure for accomplishing a business process review is to form a number of process evaluation teams around the major business processes that will be affected by the software replacement being considered. In conjunction with this activity (or a simpler business requirements approach, if that option is selected), a technology evaluation team will also need to be formed to work closely with the business teams to develop proposals that will align the institution's information technology infrastructure with identified strategic directions and business requirements.

If your institution has not been previously involved in business process review efforts, it may be useful to bring in an outside consultant or peer manager from another institution, who can provide some initial training and exposure to the issues to be addressed and examined. In addition, as recommended earlier, it will be important to provide some training in the skills needed for working in a team environment, as often the people responsible for transaction processing in financial organizations have not previously been exposed to such skills and these will be key players in the process reviews.

The work of the business process evaluation teams will be taking place in concert with the technology evaluation, with frequent interaction between the technology team and the business process teams. This will enable the evaluation of available resources for the highest priority redesign proposals, as they are discovered, and will ensure that the suggested process changes are supportable with existing tools. The technology evaluation team will build on the work of the business teams as they move forward, as well as articulate the existing institutional technology environment and investigate the technology marketplace, within the context of the institution's broader technology strategy.

Depending on the scope of the project or size or complexity of the institution, it is quite possible that the project management team might choose to establish a single evaluation team, charged with both business process and technology evaluation. The functions described for the business process teams thus would be combined with those described for a technology evaluation team, and the combined team would progress through the business and technology evaluations together. For example, at Sinclair Community College, during the evaluation phase the technical staff (the systems analyst for the business area) prepared a draft of the business functions and features which the business staff validated, revised, and updated. This process, in fact, was also used to identify gaps in the existing system and propose additional functions and features for the new system. Similarly, at San Jose State University, the module "owner" prepared the needs analysis and the systems analyst interpreted it into a possible solution, which was then negotiated to the actual solution.

Evaluating Business Processes

Evaluating business processes is related to a variety of concepts in the business world — total quality management (TQM), work flow redesign, systems design (referring to more than just computer-based systems), business process reengineering (BPR) – and all have been carried over to the higher education community to some extent. Any of these constructs or techniques can be used to achieve the necessary goal of examining the processes at hand and the purposes for which they are used, to think "outside the box" about refining the processes to achieve their goals more efficiently and effectively.

A variety of factors can prevent an institution from using "hot" new management tools effectively – lack of appropriate training in how to apply the models; a resistance to change from key stakeholders of the processes being reviewed; lack of support for such study from institutional leaders; disagreements within the campus community about the necessity for change in these areas; and being overwhelmed by the jargon and exercises of the models, to the point where it is not possible to produce an effective study and report. In fact, it is better to adopt the tools of these disciplines and eschew the jargon wherever possible.

Managing all of these risks, in order to get maximum advantage from the process review, is one of the critical success factors in the business evaluation process stage of the project.

Involving the "Right" People

The primary work of the business process evaluation teams will be performed by the line workers from the financial areas and the "customer" units, supplemented with information technology staff as appropriate. These teams will later form the basis for implementation partnerships, so an effective working relationship developed at this stage of the project will facilitate the implementation process, as well.

Managers within the financial units should also be involved in reviewing the work of the teams and providing clarification when necessary, although their role must not interfere with fully recording both the current practice and that which would be preferred. (See the sidebar beginning on the next page for a suggested composition of teams that might be formed to evaluate a number of common business processes.)

While outside consultants may be useful in shaping the process by which the business analysis is performed, the resulting product must be one that is institution-specific, and thus one that is fully shaped by institutional players. Having appropriate members of the community involved in these efforts will be key – senior managers must demonstrate ownership of the process and support for the outcome, while managers of the financial units will need to set priorities for change and provide guidance to the overall process.

Users and providers of the services, both centrally and in the core academic units, must also be involved in the analysis of the status quo and the structuring of alternative methods of doing business. The introduction of new ways of processing transactions or passing data is trivial compared to the challenge of new ways of administering the overall processes of which these transactions are a part, and the data that result. Business process redesign needs to be "customer driven," and customers are everyone involved in a process and its outcomes. In the final analysis, success for this part of the project will be driven by the functional users of the systems, not the technologists who support the systems.

Involving all these key players in the review process will result in significant success in effecting change in the institution. If the stakeholders have participated in the business process evaluation and see that the proposed changes will better enable them to be served by "the system," they will become the strongest advocates for the changes being recommended, which will move the implementation project forward more swiftly. If they do not feel that they have been consulted, or do not see that the recommended changes will make any significant improvement in reaching their goals, the implementation process will be long indeed, and possibly destined for failure.

Selecting the processes

In most institutions, the financial business processes to be evaluated will include:

- procurement/payables
- general ledger accounting
- personnel/payroll/benefits
- receivables
- investment/gift accounting
- financial reporting/decision support

While sometimes dealt with as part of the student system, the financial aid process may also be included in the financial business process review depending on the organizational structure and

[redacted]

institutional culture. In addition, the physical plant area may or may not be viewed as part of the financial processes, including maintenance scheduling, work orders, and stores management and supplies inventory. Other functions that might be included are operating and/or capital budgeting and planning (increasingly important functions that need to be integrated), grants and contracts management, and inventory and fixed assets.

In determining which processes to evaluate, it is important to conduct a scan of the external environment to learn from the experiences of peer institutions that have engaged in business process reengineering. This effort is both a time-saving and stress-saving device, as well as a strategic exercise that will enable the project management team to focus quickly on areas where the process will have an optimal chance of success. This external scan will provide an opportunity to see what has worked for other institutions and businesses, and what have been pitfalls or areas of material challenge. It is also valuable to review best practices in industry to help define the state of the possible.

In addition, other broader institutional priorities outside of the financial systems project must be taken into account when defining the nature and scope of the process evaluation effort. Are there other process evaluation projects planned or ongoing in other areas of the institution, and if so, how does the financial project complement or contrast with those? As the process evaluation effort makes it possible to more closely match current institutional needs with current technological realities, an understanding of which areas are of most institutional significance will be crucial when deciding which problems to solve first and most completely.

Indeed, the strategic selection of appropriate processes for review and potential change can help to avoid another project land mine, that of focusing efforts on an area that is not important enough. It is often tempting to select a project that is viewed as "stand-alone" or "lower priority" in order to decrease the pressure for success. Unfortunately, this also decreases the interest in success and makes it harder for the resulting changes to be accepted, since they are not seen as being of significant import to the institution's overall mission. Although financial systems are often viewed as an institutional priority, that is not always true, and within the general rubric, some systems can be viewed as

Potential Business Process Teams

✓ **Procurement/payables**

This team should include purchasing buyers, disbursements clerks and managers, departmental administrators who are responsible for departmental purchasing, representatives from shipping/receiving, and perhaps some faculty members who are involved with procurement for sponsored research projects. This team will need to evaluate and recommend changes to the way the institution requisitions, purchases, receives, inventories, and approves payments for goods and services, examining the roles of the different offices and individuals, the institutional needs being met by each step, the amount of approval and control that is necessary, and alternative processes that could be used. The priority, as with each of the business process evaluation teams, is to continue to meet institutional requirements with a minimal amount of duplication of effort, exploiting technology tools as facilitators in gathering, processing, and using data.

✓ **General accounting**

This team should include representatives from the accounting office who have responsibility for generating the institution's financial statements, individuals from departments and schools who provide and supply accounting information within their areas, internal audit staff if available, budget/financial analysis providers, and others from departments who are regular users of the institution's financial records (such as the fundraising office, the president or governing board area, major research centers, and so forth). This team will evaluate the institution's current chart of accounts and accounting transaction management, and recommend necessary changes to the chart and to the processing of transactions, both for financial reporting purposes and for day-to-day management.

✓ **Personnel/payroll/benefits**

This team should include representatives of the human resources area, particularly those involved with the addition and deletion of employees from institutional records; managers and clerks who deal with the generation of paychecks for faculty, staff, students, and other affiliates of the institution; representatives of the benefits processing area who rely on payroll/ personnel records for eligibility information; department administrators who feed payroll information on individual employees into the payroll system, both from major institutional units who process significant amounts of information and from smaller units whose challenges will be of a different magnitude; and representatives from the institutional research area or other offices who rely on this information for counts of employees, dollars spent, benefits accrued, etc. This group will need to consider how employee data move from inception

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to paycheck, benefit accrual, and termination, and consider all the appropriate subsystems that support these processes.

✓ Receivables

This team should include representatives of both the general receivables and student receivables operations, as well as the financial aid area; administrators from departments that are major suppliers of services and therefore rely on the accounts receivable operation; institutional research and budget/financial analysis representatives who will rely on this information (particularly student receivables data) in projecting the financial status of the institution; and representatives of affiliated areas who receive bills from the institution for the provision of services (e.g., student organizations that are separately incorporated, purchase services from the institution, and are billed through the receivables process). This group should examine both how transactions are entered (as well as how the delivery of these billing services is perceived) and the methods of accessing and using the resulting data.

✓ Investment/gift accounting

This team should include representatives from the investment management function, individuals from the general accounting area who rely on the investment reporting structure for financial reports, fundraising office representatives who have some responsibility for gift processing and reporting, representatives of affiliated institutions who may process their own fundraising proceeds, those responsible for cash management of the institution, a representative of the cashiering function, and an internal audit representative if appropriate. For some institutions, a connection with the working capital and/or custodian bank will also be helpful.

✓ Operating and capital budget/planning

This team should include budget/financial analysts, administrators from both large and small departments who are responsible for the generation and submittal of departmental/school budgets, representatives of the facilities area who manage capital projects, and those from the investment area who are responsible for the management of capital funding sources.

✓ Grants and contracts management

Representatives from departments who are major generators of grant and contract activity should make up the bulk of the team. In addition, it will be useful to include representatives from the general accounting area who incorporate this information into the institutional financial statements, representatives from the receivables area who are responsible for the processing of funding requests to sponsors, and representatives of the payroll/personnel and procurement teams, as these are major service areas to grant and contract activity. Finally, representatives of the areas that handle the "pre-award" grant and contract activity will be important, as well as faculty members who serve as principal investigators and therefore have frequent interaction with both the "pre-award" and "post-award" processes at the institution.

✓ Inventory/stores

Department administrators responsible for the ordering and receiving of equipment, hazardous materials, animals, and other major procurement items, as well as purchasing office representatives, accounts payable representatives, and those who handle any on-campus distribution and/or stores inventory should be included. Again, faculty who are responsible for sponsored research procurement may be helpful in evaluating these processes.

✓ Financial reporting and decision support

This team should include representatives from departments who are regular users of the institution's financial data, such as the fundraising office, the executive or governing board area, the budget office, and institutional research and planning, as well as mid- and upper-level managers who need access to institutional information in order to manage and revise institutional operations. The team will focus on ensuring that the data-mapping exercise has fully captured all appropriate levels of data to be stored and retrievable, as well as considering what reporting and access tools will make the data — and metadata — most useful to institutional decision-makers.

✓ Financial aid processing

This team should include representatives from the financial aid area, the student receivables function, the student loan function, and the federal funding collections function. In addition, representatives from admissions, the registrar's area, student employment, and perhaps some student advisory functions should be included, as well as some student consumers of the services being provided.

✓ Physical plant operations

If facilities operations are considered part of the financial systems of the institution, this team should involve supervisors and workers in the trades areas who would rely on a work-order system and an inventory management system, representatives of departments who are consumers of these services as residents in campus buildings, the facilities manager, and the business managers for the physical plant areas.

more significant than others. Focusing significant institutional resources — in the form of team involvement, report generation, and so forth — on an area that does not enjoy significant institutional focus can produce a result that is of insufficient interest to merit additional attention and support.

In a situation where several possible projects have equal importance or significance, choosing first the one with the greatest chance of success is a wise strategic move. Defining the business process targets realistically by identifying the key problems to be solved, and also those that are not going to be solved, prevents the business process evaluation effort from becoming overwhelmed by potentially competing problems. With an evaluation effort focused on too wide an area, the time between study and resolution will overtake the team's enthusiasm for being involved in such work, and all subsequent evaluations will suffer from lack of involvement due to project burnout. Keeping the analysis and results focused on key areas of the process under review both facilitates a sense of accomplishment on the part of team members and provides a useful and concrete product to be used in creating the requirements document.

Another strategy for keeping the chosen set of projects manageable in scope is to consider those areas that could be left in their current configuration, but interfaced to a new, redesigned financial process. This could require only the creation of a technological interface between a current system that will not be replaced and the newly implemented financial system, or it could mean creating a "process interface" feeding new processes that have been redesigned off of existing systems that are found to be relatively effective. The University of Delaware is successfully using this approach.

Staying connected to the steering committee strategy

Keeping the business evaluation process connected to the steering committee's strategy is critical to ensuring that the institutional values, principles, and priorities are well understood and incorporated into the planning and analysis. At the outset, institutional support for introducing significant change must be robust, since the natural reaction of many institutional players will be to doubt the wisdom of any significant process change. Without strong management support for introducing new ways of doing business, the evaluation will focus only on tinkering at the margin of existing processes, which will be both time consuming and of relatively little import.

The analyses must address strategic questions about the present and the future of financial management practices at the institution. Much of the general construction of these analyses can be based on the overall analysis performed by the steering committee in setting the larger goals for the project — the business process evaluation will build on this steering committee work by looking in greater detail at particular processes.

Institutional direction is also an important component in structuring the business evaluation effort effectively. Is there an interest in redefining administrative priorities or organizational relationships (i.e., moving from a more centralized to a more decentralized responsibility center model) or in redefining the role of financial analysis and understanding in the decision-making of the institution? There are no right or wrong answers to such questions, but the business process evaluation effort must be focused in a way that complements the future direction of the institution as a whole, as will have been reflected in the initial report of the steering committee.

Finally, it is important to balance this project against other institutional priorities; by allowing it to expand beyond reasonable bounds, the level of change introduced to the institution may overshadow any good done in these specific areas.

Conducting the process reviews

In conducting the process review, the business process teams are responsible for ensuring that two questions are fully and fairly answered: "What are we doing now?" and "What would we like to be doing in the future?" In evaluating business processes, key institutional players will be able to engage in "blue sky" discussions about ideal processes, followed by a comparison of such ideal processes to current practice, and a comparison of "blue sky" technology requirements to available technical tools. Redesigns of key business processes can then be recommended, presented in contrast to current practice, and grounded in the reality of available technology solutions.

All members of each business process team should be involved in documenting, reviewing, and recommending changes to the current process they are evaluating. These evaluations can be managed in as formal a way as "process flow documentation" sessions, supported by outside consultants and relying on full-day retreats and deliverable documents; or they can be informal brainstorming and note-taking sessions convened over the course of a few weeks involving one or two staff from each financial processing unit (payroll, accounts payable, and so forth) – the level of formality of this process should be driven by institutional mores, expectations, timeframes, and budgets.

Each team, however, should complete its process by being able to describe the significant "inputs" and "outputs" for the process, the tools currently being used (technology-based or otherwise), and the expected new approach as described through text, visual mapping, or a combination. This process description should include information about the planned uses for technology in this new environment, in enough detail to make the evaluation of currently available technologies possible. (See the sidebar below for an example of the evaluation of the procurement/payables process at a medium-sized institution.)

A key component of this phase of the mapping process is "data mapping" or "data modeling" – the process of articulating key data elements that must be captured, stored, and managed, the purpose and/or use of the data, and the rules for each of these functions. Including a data mapping process at this point will enable the business evaluation process to most effectively introduce changes, and will also ensure that the project meets key decision support needs for the institution.

For example, Indiana University spent 18 months doing data modeling with the departmental users before a request for proposals (RFP) was produced for its new financial system. While there was a lot of resentment at first about this potential waste of time, in the last analysis, there was almost universal agreement that it was a major factor in the ultimate success of the entire initiative. Both users and financial staff seemed to learn a great deal about how the process should work in the new system, and it made the RFP process easier and resulted in a

Procurement/Payables Process Evaluation: An Example

The procurement/payables team begins its work by convening for a half-day session to document the current procedures involved in requisitioning, purchasing, receiving, and processing invoices for the major categories of purchases at the institution. This analysis includes not only the technology tools but any other tools that are used in moving a purchase through the system. The analysis highlights major areas where subunits of the institution use separate subsystems (e.g., shadow procurement systems developed to maintain encumbrance information).

This documented process then is evaluated for areas of maximum effciency/inefficiency and maximum cost, and each of these areas for opportunity is prioritized:

- How important is it to the institution to replace shadow systems in individual units?
- How important is it to reduce the need for paper storage in documenting purchasing requirements?
- How significant is strict compliance with federal procurement regulations?
- How many prior authorizations are necessary, and what role can post- versus pre-approval play?

While these areas of opportunity are being analyzed, the technology evaluation team is exploring likely tools to assist in making significant process changes—e.g., electronic funds transfer with vendors for payment of invoices; electronic authorization of requisitions, purchases, or payments; and document storage and retrieval systems.

The procurement/payables team then puts together a report that reflects the highest priority process changes and describes the technology tools necessary to support those changes. A preliminary analysis of the cost/benefit of these process changes also is prepared at this time. The technology evaluation team includes its analysis of which tools are most available, and which are most likely to be problematic in the current marketplace, so the project management team can see the correlation between highest-impact changes and likelihood of available tools. This analysis is then combined with those being prepared by the other business process teams, into a single requirements document that will form the basis of the request for information and, eventually, the request for proposals that will be issued to potential solution providers.

savings from dollars that would have had to be paid to the external partner had it not been done.

It is also wise to consider the notion of metadata, i.e., data about data — what they mean, where to find them, how to interpret them, and so forth. As distributed reporting increases, end users must be educated about what the data mean, and there will need to be a way to maintain this information so that it is readily accessible by users. Purdue University, for example, uses the World Wide Web to provide easy access to its metadata with hypertext links to diagrams, examples, and high-level and detailed definitions to support both the novice and the expert user. Document management and generation for the Web is an automated process, so it requires less maintenance.

Given the future need for this kind of information, rather than adding it as an afterthought later in the process, the business process teams can be asked to develop documents in a prescribed format during their evaluations that could then be easily incorporated into the later documentation and training materials.

Reviewing the results

When the business process teams have completed their work, the resulting process redefinitions must be robust enough to reflect a significant rethinking of the business process involved, while continuing to function within the institutional climate. For example, if your institution has very centralized governance and systems, you may not be able to incorporate a highly decentralized procurement process within your operations without a significant impact on the work of the other units involved.

This redefinition of process also must be flexible enough to be shaped by specific software solutions as they are selected. It is for this reason that the technology evaluation team and business process teams must work in tandem, with frequent sharing of information, and perhaps supplemented by strategies such as overlap in team makeup, so that this work can be completed in synch.

This process of confirming the existence of technology tools that are consistent with business process recommendations represents a critical success factor for the project. Although any process evaluation effort will have as an early stage a "blue sky" exercise that imagines the ideal world of completely revamped processes, it is important at some point in the effort to bring the recommendations back to earth.

When discussing technology tools, the project teams should be aware of the need to manage the institution's expectations about the use of those tools — that is, to be clear about the distinction between the existence of the technology and the institution's ability to use that technology to support change. The analysis of whether that technology exists in a form that is mature enough, well-supported enough, and robust enough to be used in whichever key institutional process is being examined is a continuation of the gap analysis that was part of the steering committee's work. This analysis should be performed relatively early in the process review, so that the work to create an imagined redesign remains firmly grounded in the reality of potential technology solutions.

When the business team reports are in a representative semifinal state, they should be reviewed by the project management team to provide an opportunity for cross-team integration, and then referred back to the steering committee to ensure that the recommended changes are within the scope of that committee's institutional vision.

Communicating expected outcomes

A key set of expectations that must be effectively managed in this stage of the project is the community's understanding of what difference the potentially redesigned processes will make in the life of the institution. A cost/benefit analysis can build a business case for introducing process change, but it can also set unrealistic or artificial goals for the project. Clarity from the outset about what "effectiveness" means at your institution — what the problems are for each process that need to be solved so that success can be defined and measured — is key in each process redesign analysis. Measuring the resulting redefined processes against the goals that were to be achieved in making change is a completely appropriate reporting/management step, which enables all involved with the process to confirm that the appropriate outcomes were achieved.

Particularly for processes that cut across a variety of traditional institutional boundaries, it is important for the broader institution to be kept informed of major recommendations, so that their impact on other areas of the institution can be analyzed and integrated into ongoing plans.

Of course, the extent to which process changes are deemed vital to the success of the project, and the availability of technology tools in the marketplace to support those changes, will be key factors in the decision-making about whether to buy a system, develop or migrate systems in-house, or partner with other institutions and/or vendors to build a new product jointly.

Evaluating the Technology Environment

The expected outcome of evaluating the technology environment is the identification of a set of technological alternatives, potential impacts, and recommendations to the project management team for inclusion in the requirements document. The work of this phase is performed by a technology evaluation team – appointed by and including some members of the project management team – whose overall goal is to develop proposals necessary to align the institution's IT infrastructure with the strategic direction and business requirements of the financial systems project. To develop these proposals, the team will:

- assess the technological scope of the project,
- identify possible technological alternatives through technology awareness-raising,
- document the institution's existing technological environment, and
- collaborate with the business process evaluation teams to assist in the articulation of realistic and supportable (with technology tools) process change recommendations.

The composition of the technology team must balance strong technology leadership with equally strong business representation. Such strong technology leadership is essential, particularly when there is a greater paradigm shift required (for example, if the steering committee gap analysis has identified a large gap between the current mainframe environment and a proposed client/server technology strategy), and the team members will need to arrive at a consensus.

The team will need to become thoroughly familiar with current and emerging technology products and trends, especially those in the proposed environment. In particular, an IT staff member familiar with the existing financial system applications should be assigned to the team. IT staff representation on the team should include both "desktop" expertise and "data systems" expertise, especially if the technology direction of the institution as a whole assumes a move toward distributed solutions. Equally strong business representation on the technology team will provide necessary user insight into the issues related to the institution's installed systems and the viability of any proposed new technology.

The technology team will likely look at current systems from a technological standpoint rather than from the view of the business processes that the technology supports. As an example, the documentation of the existing IT environment would identify the hardware, software, file sizes, production times, number of online users, response times, and other information of this nature, but would not necessarily identify the functional processes provided by the technology, such as processing checks for accounts payable every day versus every two weeks or analyzing payments for potential duplicates. The level of knowledge of the team members from the IT staff with respect to current applications will depend on the technology currently in use and whether the existing systems were purchased or developed in-house.

Assessing the technological scope of the project

Selecting or developing an effective, quality financial information system is not, primarily, a technical decision. It is important, therefore, that the technology team accurately assess the extent of the technology impact on the project. The scope of this team's efforts will be directly affected by work that has already been done by the steering committee, and the ongoing work of the project management team and the business process teams.

The steering committee will have articulated an institution-wide strategy that will enable the technology team to draw parameters around the technical scope of the project. Reviewing these conclusions will provide valuable insight for the technology team in assessing how far the institution wants to push the technology window and, conversely, to what extent the institution intends to be more comfortable with proven approaches.

✔ ***Review the institution-wide strategy***

One approach to reviewing the steering committee's work in establishing an institution-wide strategy is to raise questions about leadership, organizational structure, and access philosophy, such as those listed in the sidebar to the right. If the steering committee has recommended taking a leading-edge financial system approach, it is important to bring the rest of the institution along with that position. Financial systems have a wider impact today than they did in the past on units outside the traditional financial units. Leading-edge approaches will probably involve imposing learning and expenditure requirements on distributed users that they might not accept. This is why institution-wide consultation is important.

As the team reviews each of the areas in the sidebar, it is important to assign some relative value or weight to each. In determining the relative value of technological approaches, it is often necessary to trade off values and constraints across these various areas. For example, the value of technological leadership and planning for the future might be weighed against the need to resolve some real business requirements issues in a timely manner. If those kinds of weights and priorities have already been specifically stated by the steering committee or the project management team, this certainly will help with the technological evaluation. However, where these kinds of issues have not been spelled out, the technology team needs to arrive at some sense of the relative value to the institution, and feed this back through the project structure for validation. Otherwise, much valuable time and energy can be mistakenly spent on resolving technology issues that are not germane to the work of the technology team.

Technology Leadership Strategy:

- Has a desire for the campus to be a technology leader been articulated as part of this project?
- Has the strategic vision identified the institutional culture as conservative or leading-edge?
- Is the focus on designing for the future or on resolving existing issues and concerns?

IT Infrastructure Strategy:

- Is the existing IT infrastructure and method of operation to remain intact?
- Have requirements been set that the financial systems applications need to co-exist within the same or different database or technological environment as other core administrative applications?
- Has a target information technology architecture been defined as part of the strategic vision, e.g., has the steering committee identified a specific technology strategy — migration to client/server, outsourcing, leveraging existing mainframe platform?
- Does the strategy identify a central or decentralized model?

Information Access Strategy:

- How has the steering committee described the institutional culture or philosophy with respect to information access, i.e, how important is access to financial information?
- Is ease of use a characteristic found in the conclusions of the steering committee, and how important is user functionality versus technological advancement?

✔ ***Review project parameters***

The technology team will need to establish whether it has autonomy with respect to the definition and identification of technology issues and to identify potential partnerships on technology issues with other teams. The latter can be accomplished by reviewing and aligning roles and responsibilities, identifying its reporting relationships within the project structure, and defining any specific reports or review points that may be required.

Another significant factor is whether the project has encompassed a traditional needs identification approach or a business process evaluation approach. Where there is a need to rapidly resolve a particular set of issues or concerns, and where change in itself will create the necessary results, the technology evaluation team will be looking at fairly traditional technology responses to the business requirements, such as the purchase of an off-the-shelf product.

The technology team will also need to review the timelines that have been established by the project management team. Short time frames for decision and implementation may represent a conflict with a strategy that requires significant technology changes. For example, with the higher risks associated with such technologies as client/server, the technology evaluation team may want to review the steering committee's recommendations regarding the tradeoffs between gradual and discontinuous change. Although it is more difficult to achieve, gradual change has the advantage that it can be "rolled out" on a timetable that is both technologically attainable and organizationally sustainable. People do not change work habits easily, so a gradual approach may afford the time they need to "ease into" the new system rather than changing everything overnight. Discontinuous change, on the other hand, has the advantage that it gets results and gets them faster than with the gradual approach. Often, the needs of the institution are such that large, wholesale, discontinuous change is the only way to achieve the goals of the project.

Having completed all of these reviews and checked the results with the project management team, the technology team will be in a position to accurately estimate the scope of the technology portion of the task. This kind of a review process can significantly simplify the role of this team. The answers on technology requirements become more apparent and the technology evaluation can be carried out fairly easily. For example, the team may have learned that the project must follow existing standards identified by the IT organization or they may find there is a great deal more flexibility to pursue alternatives and arrive at recommendations to change the base for technology at the institution.

Identifying technological alternatives

A technology awareness-raising exercise will enable the technology team to place the scope of the project within the context of the current state of financial information systems technology and identify possible technological alternatives. Team members will benefit significantly from such an exercise and from information on the concepts and language of the newer technologies.

In some cases, the team members may lack current knowledge in the field, mainly because day-to-day work loads have precluded them from being involved in new technology projects. Even some of the IT staff on the team may require some updating on newer hardware, software, and development capabilities, for the same reasons.

✔ ***Understand new technology terminology and concepts***

Some exposure to the technological concepts and language will be most valuable for the team. As various discussions are held, the technology language will become part of the day-to-day communication between people and an awareness of alternatives will occur. Appendix B provides a glossary of terms with brief conceptual descriptions that can be distributed to the team members to promote a better understanding of the language and concepts. The appendix list is by no means exhaustive, and these concepts will change over time. The team may wish to add other items as terms are discussed as part of the awareness-raising activities.

The tools available for technology solutions are changing constantly, so the technology team will need to examine emerging trends as part of its evaluation. Reviewing the latest trends will allow financial systems staff and other nontechnical members of the team to become more aware of the environment of current technology, understand its impact on the possibilities for business process improvement, and help to set out the right kinds of questions on the evaluation of technology relative to the needs of the institution. Of course, your institution will have to decide, based on the institutional culture, available resources, competing needs, and so forth, what position on the "technology curve" is appropriate. Some overall technology directions apparent at the time of this book's publication include the following.

Ubiquitous use of networks. Migration to a client/server environment, particularly for transaction-intensive processing such as is required in financial systems, is not moving as rapidly as many had assumed, but it appears that network-based management of data is becoming more prevalent in all institutional applications. The technology team will therefore need to evaluate the current and future campuswide network availability, and take into account the hardware, software, and management issues that these services present.

Client/server developments. Particularly for many of the decision support systems or subsystems that are incorporated into financial systems development, a client/server environment will be viewed as facilitating an appropriate level of data management tools for each decision-maker. This does *not* mean that "the mainframe is dead"; indeed, many of the servers being introduced in the new world of client/server are performing the tasks of a traditional mainframe, relying on the client machines for very little transaction support. Technology team members will need to understand the impact of these new tools on current and future technology management at their institution.

Open systems. The movement away from proprietary operating systems and databases, and toward an environment where moving information across systems and platforms will be "seamless" is likely to continue. Proprietary systems and databases have historically partitioned institutions into administrative, academic, financial, student, and development "camps" that did not work together effectively. Financial systems and information systems, in general, require wider participation than in the past, and these partitioned solutions are being reexamined. Financial systems must be increasingly available to nontraditional users who may or may not be in the right proprietary camp.

How quickly the reformatting of these proprietary systems into truly open systems can take place, and what impact the existence of proprietary tools (within an open structure) will have, is not yet clear, but incorporating the ability to support an open architecture will be an important point of discussion in planning for future systems implementations.[7]

Object-oriented technology. Object-oriented technology is having an impact on the development, enhancement, and replacement of systems, whether vendor-supported or homegrown. Institutions will likely be greatly challenged by the loss of technical support for the "legacy" systems that have been supported by traditional programmers, many of whom may perceive an advantage to being trained in object-oriented programming for their own professional growth.

Electronic commerce. It is now possible to reduce paper, reduce filing, and improve institutional productivity using electronic commerce. There are a number of important components to electronic commerce solutions, each of which represents improved business processes. In considering these technologies, the technology team should be sure to collaborate with the business process teams.

- Electronic approval (or electronic signatures) can streamline internal processes within the institution.
- Electronic data interchange (EDI) can be used to place orders for equipment, stores items, travel, and vehicle reservations, and is already being used to exchange student transcripts by several hundred colleges and universities.
- "Smart-card" technology offers many advantages – procurement cards can be used to place small orders without prior approval, and debit cards can be used to automatically deposit student loans.
- Electronic funds transfer (EFT) can be used to deposit student loan tuition payments without clerical involvement. Automated Clearing House (ACH) is a federal funds transfer technology that can electronically deposit or receive funds in the institution from students or businesses. ACH can replace expensive paper check transactions (that may cost as much as $35 per check) with inexpensive electronic transactions at a few cents per transaction.

While these technologies may not be direct components of the financial system, the financial system needs to be designed in a way that encourages and accommodates their use.

✓ *Identify "best practices"*

If an expectation for change has been established, the technology team will need to be exposed to external "best practices" to understand the potential for improvements in the current processes and systems. A key responsibility in this stage is the identification of other institutional experiences that can add value to the discussions on technological alternatives. Such investigation will almost certainly also identify potential hardware and software products for financial systems in the marketplace.

Some preliminary work in this area will have been done by the steering committee, but it will be up to the technology team to investigate in more depth the practices already identified as well as to identify additional ones. There are various ways that this can be accomplished. The technology team can consider the following suggestions and develop other approaches to meet the particular needs of its own project scope, time frame, and other factors.

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[7] Two standards-based technologies emerging at the time of this book's publication are Open Database Communication (ODBC) and the Open Software Foundation's Distributed Computing Environment (DCE). Some institutions (such as the University of Colorado) are beginning to stipulate DCE compliance as a requirement for their new systems.

✓ The team can develop relationships with other institutions and individuals to learn from the external expertise that is available. Organizations such as CAUSE, NACUBO, and the League for Innovation in the Community College will prove to be excellent sources of information about financial systems and institutions that have recently developed or installed new systems. In many cases, existing documentation can be provided by those groups on actual or proposed installations. Several consulting firms also work with colleges and universities in planning for new financial systems.

✓ Site visits to other institutions that have implemented financial systems can be arranged to provide peer-to-peer communication on what is installed, what works, and what doesn't. This needs to be a selective process (since there is normally a limit on the funds allocated for such activities) that can often most effectively be done in concert with the review of peer institutions and their business process changes that the business teams are conducting.

✓ Current vendors in the field can provide an overview of their products and services. A significant number of vendors provide financial systems applications on a variety of hardware platforms. Some of this information can be accumulated from brochures and other printed materials, through discussions and conversations, and by linking to product information available on the World Wide Web.[8]

Keep in mind that this consciousness-raising is not directly related to how vendors' products fit the specific needs of the institution, but more to identify the overall approach of vendors in using technology to provide products. The technology team should note which vendors appear to be close to meeting the needs of the institution, since this list can be used at a later stage to issue an RFI.

A note of caution is warranted here. It is wise to discourage vendor visits to your institution for presentations or product demonstrations at this stage of the project, that is, before requirements have been fully articulated. The greatest technology-related project land mine is to become prematurely committed to a particular solution before the review process has been completed or the requirements document prepared. The ultimate determination of the technology to be used will be that it can effectively support the business processes that are being defined by the business teams, within the strategic technology direction of the institution. In other words, the latest and greatest technology is not necessarily the appropriate solution to the business process requirements. In many cases, members of the technology team will be responsible for the implementation of the system. If they buy into a technology that is later not selected, the implementation path may become much more difficult.

Documenting existing and planned institutional IT infrastructure

Team members will need to be able to determine the institution's current and future directions for information technology. While institutional culture in general – leading edge, conservative, moderate – will already have been considered in reviewing the steering committee's work, another, more definable set of characteristics can provide further insight into institutional IT strategic directions. That is, the team should identify and assess what technology choices and priorities are already in place, as reflected in the present infrastructure, in order to understand the basis for future technological recommendations and solutions, as reflected in the institutional IT plans and visions.

✓ ***Address infrastructure issues***

The information technology infrastructure of an institution can be defined as those building blocks that are not applications or programmatic in nature. In investigating these areas, the team might pursue some of the following questions:

- How is the information technology division organized, what is the structure of IT resources, and what are the current relationships with vendors or other external partners?
- What are the current technologies in place, for example: mainframe systems, open systems, distributed systems, client/server systems, proprietary operating systems, installed networks, terminal and workstation access to applications and databases, installed databases, query languages?

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[8] See Appendix F for a list of CAUSE and NACUBO corporate members with products and/or consulting services related to the financial management systems area.

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- What is the institutional strategy with regard to data warehouses? Will the IT organization provide data warehouse services or will those services be provided by offices such as the finance office?
- Is there an open institutional architecture for client/server solutions either now or in the planning stages?
- Do institutional and/or departmental standards exist with respect to the areas of security, access, databases, networking protocols, backups, recovery, and production operations?

An important part of this evaluation will be determining the true nature of computing at your institution. In this evaluation, the location of the physical equipment, servers, or processors is not necessarily the issue. Centralization may be in place for operational issues such as system and database backups and maintenance, but the true method of operation may be distributed, particularly related to development, purchasing, training, and support in the applications areas.

This consideration is becoming increasingly important as the technology provides for distribution of responsibilities from central to distributed environments. The infrastructure of the institution comes under scrutiny to identify how these various development and support resources will be deployed for the prospective financial information systems. There are models that indicate that the ongoing, first-level support of the applications, including interactions with the application vendors when outsourced, will be done by the "owning" departments. Implementation of new releases and interaction with the vendor's technical staff may be carried out through central staff with day-to-day application questions being directed to the help desk or response line of the application provider. The technology team can establish, and include in its profile, the model currently in use at the institution and use this in evaluating the impact of alternative system offerings.

In addition to assessing the current environment, the team should obtain the IT organization's strategic and operating plans and any vision or values statements the institution has developed for investment in information resources to ensure that future directions are taken into account.

Strategic plans, planning principles, and vision statements will provide the team with the necessary information about technology priorities for the future, preferred information architecture solutions, any institutional standards that are being planned or are currently in effect, and any other significant information technology priorities that may work in concert, or conflict, with this project. (See Appendix A for examples of planning principles.)

The operating plan will provide information about the current focus of the information technology organization, which will enable the technology team to better plan the level of institutional technology support that will be available for this initiative, as well as any currently existing standards or guidelines that should be taken into account in the immediate future of this effort. Having a thorough understanding of the already existing commitments of the technology organization will enable the technology team to make more realistic recommendations, and will give the project management team the necessary information for assessing how much of an additional burden can realistically be incorporated, institutionally.

Failure to understand the standards, policies, and procedures within the existing or planned technological environment will result in unnecessary conflict. Policies and procedures within the IT organization may be less obvious than the hardware and software currently in use for the existing financial system. However, issues related to access, security, job scheduling, database management, recovery, backups, and other areas may be generalized for all systems and not readily apparent in the specific financial systems area.

This can also be true for functions that may be carried out at the department level. Some departments may be printing their own checks or signing checks using hardware and software at the department level. Too much focus on central IT functions can miss these items. The team needs to be sure such points are not left out of the evaluation of the current technology environment because they will become significant during later stages (selection and implementation) of the project.

✓ *Articulate development and access philosophies*

To evaluate your institution's philosophies concerning systems development and implementations, the technology team might ask the following questions:

- To what extent have existing applications been developed in-house? Is internal development the standard mode of operation? If so, what applications development methodologies and tools are being used?

- Do external vendors supply some or all of the administrative applications? What partnerships have been established between the IT organization and internal and external suppliers?
- Has there been movement toward an institutional architecture to support client/server computing? If so, is that architecture open and accessible to all institutional constituents or is it proprietary?
- What enhancements of services have been provided in recent months?
- What is the level of internal resources available, in hardware, software, space, and staff?
- Which applications or developments are driving the institution's technological direction?
- Which applications and/or databases have been integrated to provide enterprise data?
- Is enterprise data integration a basic approach to the ongoing development of new applications?

The team should also review current strategies and directions in the areas of transaction processing and decision support systems. Is the institution moving in the direction of providing more and easier access to data in institutional information systems? Are transaction processing systems being integrated into a common database in order to provide enterprise-wide access to information for decision-making purposes, or is the institution taking a data warehouse approach, reducing the need for transaction integration?

Often the achievement of significant business process change requires an ability to integrate data across major applications such as student information systems, human resources systems, and the financial systems. This issue is extremely important in the financial area, which has traditionally focused on processing transactions and producing formal reports, but in the future will look to decision support capabilities to play an increasingly important role in the success of information systems. The ability to access, review, and analyze online data in an interactive manner will replace the existing procedures that require requesting a standard report or requesting the design and programming of a special report to suit the needs of the departments.

✓ *Identify technological constraints and opportunities*

Based on the awareness-raising that the team has experienced, team members next will need to determine any technological constraints currently within the IT organization. Some questions the team might raise include the following:

- Is there a significant reliance on proprietary operating systems, inhibiting flexibility of platforms and potential reduction of support and maintenance costs? (Although these systems represent a sunk cost to the institution, which is not relevant for future decision-making, the existence of such systems often inhibits the institution's ability to think creatively about new solutions, and may present significant hurdles if the implementation of new solutions must be done in a way that integrates with existing systems for some period of time.)
- What progress has been made on providing networked access to administrative systems to a broad range of faculty and staff, and what development is planned in this area?
- What has been the track record of the IT organization in responding to the changing needs of the institution, internally or through outsourcing resources, and how prepared is the IT organization for working in and supporting new technology environments?
- What IT resources will be applied to the financial information system?

In addition to identifying constraints, the team will also need to articulate technological opportunities that may have been identified within the IT organization. There may already be plans to migrate to open systems, expand network access, upgrade the database and query language, indicating that some of the constraints may already have been taken into consideration by the IT organization. To the extent that such plans are under way, the technology team can factor this into the evaluation of potential solutions to the financial systems needs.

On the other hand, the team's awareness of the technological environment and current constraints may in effect enable it to recognize opportunities that may not have already been identified, and in fact trigger support for new directions and initiatives within the IT organization. The IT organization and staff will obviously be most sensitive to issues within their area. Open communication on these issues, related concerns, and possible solutions can bode well for the success of the financial systems project.

Collaborating and validating findings

Any review of technology will require a reciprocal review of existing business processes, recognizing that changing the business processes means changing the underlying support systems, as well. Thus, as previously suggested, the technology team and business process teams should work in parallel, reviewing the recommended process changes against the available technology tools, and revisiting both sets of information until the two visions can be aligned in an outcome that is appropriate to the institution, and supportable with the technology.

The more iterative this process of setting priorities, examining available tools, and reexamining priorities can be, the more likely it is that a realistic set of significant, high-priority goals will be achieved. This iterative review may increase the technological scope of the project, but alignment of the business process vision with the information technology vision for the institution is a critical factor for the success of the project.

A notable project land mine to avoid is the attempt by the technology team to impose a technological solution on a business process requirement. The potential difficulty of this land mine is not only project misdirection or lack of timeliness; the impact can be significantly counterproductive for people in both the business and IT areas when a set of false expectations infringes on the project and the lure of technology diverts the team from the true project goal of supporting business needs.

The technology team will also need to communicate often with the IT organization, especially if the strategy established in the planning phase of the project is toward purchasing a package or partnering to develop a new system. This information will form the basis for evaluation of the current environment and a comparison with other alternative technical approaches. It will also provide key information on performance-related issues that will impact the sizing of potential systems. In addition, the results of the project will require the support of the IT staff, and building effective communications and buy-in should be part of the strategy of the technology team.

While the technology team will include representatives from the IT organization — and probably have some overlap in membership with the project management team and steering committee — it is important that technology team members validate: (1) their interpretation of the institution-wide strategy for the project with the steering committee, (2) their understanding of the scope of the project with the project management team, and (3) their documentation of the current IT environment and strategic directions with the IT organization.

In addition, the team should seek the broadest possible exposure and input to ensure the value and credibility of its conclusions. Inputs and refinements resulting from such reviews can be reflected in a subsequent report to the project management team.

Identifying Disconnects and Proposing Alignments

Having received the technology team's report, as well as the business process teams' reports, which include the appropriate technology reality information, the project management team will be able to identify possible discrepancies or disconnects between the strategic direction provided by the steering committee, feedback from the business process teams, and the technology team's findings based on analysis and review of the existing and potential technology infrastructure. From these discrepancies or disconnects, the project management team can develop recommendations on how to resolve these issues.

The recommendations, therefore, should have related benefits for the project and tie back to the review of institutional strategies and business requirements. (See Table 7 for examples of the items that might appear.) These proposals may provide valuable insight in aligning the visions of the business area with those of the technical area and, ultimately, with the vision, principles, and strategies set forth by the steering committee to help establish an institutional approach to financial systems solutions. The relative values of these recommendations should also be discussed and documented.

Providing a summary of the relative values of new technology alternatives can provide major benefits in subsequent stages of the process (for example, in the selection process, it will be easier to

Table 7: Sample recommendations and related benefits

Recommendation	*Proposed benefit*
Institute open systems architecture	Greater platform selection, reduced costs
Outsource application development	Faster response to requirements
Implement improved or integrated databases	Improved decision support information
Expand network connections	More faculty access to data
Develop client/server technologies	Effective platform for applications

decide on priorities if not all requirements can be met). It will make visible the deliberations of the technology team and provide a useful tool for discussion within the team and with other project teams. It also will provide a basis for the analysis and final selection from different alternatives.

The project management team will need to identify the key benefits and concerns of new technologies reviewed during the consciousness-raising activities, and to relate these benefits and concerns to the institution's strategic directions, taking into account the possible impact on existing technologies and IT policies and procedures as well as the inputs from the business teams.

This work of the project management team will help to redefine how the institution does business using technology. The objective is to get a maximum return on the technology investment from a user standpoint while preserving the institution's standards and directions. This alignment of vision will be increasingly important as the project moves into the proposal request and evaluation stages, and will result in a set of recommendations that will move the information technology organization and the business organization into improved areas of performance and effectiveness.

Creating a Requirements Document and Finalizing the Project Plan

The final tasks of the project management team in this phase of the project are to create (1) a requirements document that describes, at a fairly high level of detail, the functionality and systems needs that must be supported by the technology solution, and includes a summary of the major strategic directions articulated by the steering committee, and (2) a revised and more detailed project scope and budget, building on the initial plan described in Chapter 3.

The requirements document will be the formal articulation of the needs assessment that has been carried out by the business process and technology teams, incorporating recommendations from the business process evaluations (which will provide information on required and desired functionality) and the technology evaluation (which will provide information on systems requirements and preferences). For example, the document should include:

- a description of the functionality that must be provided,
- a list of technical requirements that must be met (particular hardware platforms, databases, developer tools to be used, need for security management, client/server expectations, etc.),
- timing constraints in the implementation (e.g., systems that are no longer supportable require replacement first),
- depth and breadth of functionality (e.g., level of complexity in constructing the chart of accounts, amount of distributed activity that must be supported in payroll processing),
- financial constraints or considerations, and
- description of implementation support needs and ongoing maintenance/upgrade needs.

The requirements document should also include a realistic assessment of the workforce skills available in these areas of the institution, and an identification of areas where the needs assessment may be flawed due to lack of workforce expertise in providing such information. It will fall to the project management team to incorporate its knowledge of the workers involved to ensure that the needs assessment is accurate, and that the resulting solution will be a reasonable and responsible system for the institution. A clear analysis of what resources the institution can provide during both the implementation and maintenance stages will be key to the selection team being able to make an informed evaluation of the available alternatives.

The greatest risk in this phase is to be unrealistic about what level of resources and skills are available to support the proposed change — build, buy, and partner options each require differing levels of expertise, and differing levels of institutional involvement in order to be successful, so it is critical that there be a good fit between the final choice and the available expertise.

The project manager is responsible for circulating the requirements document to the various project teams for confirmation and, thereafter, to the steering committee for approval. Once approved, the requirements document will represent the blueprint for the solution that will be selected and implemented in the next phases of the project.

The project scope and budget revision should follow the pattern of the initial project plan, now including the additional work that has been done on business process evaluation and the opportunities these present for institutional change; the evaluation of technology solutions and what they will mean for the institution's ability to introduce change; and a revised and enhanced resources estimate, based on a better understanding of what current staff, space, and equipment will be most affected by the change, and what the possible range of costs of the technology enhancements will be. Although this document cannot yet include vendor-specific information as to costs for purchase of licenses, support, and so forth, preliminary estimates of the range of such costs should also be prepared, in order to enhance the evaluation process for the RFP stage of work.

This revised plan will need to be submitted to the steering committee to ensure that the evolving vision of priorities, needs, and available resources continues to fit within the broad outline of the steering committee's original recommendations. Conversely, if the additional work by the technology and business process teams has brought the project team to a new understanding of what the primary needs are, and/or what the necessary resources would be to meet those needs, this information needs to be shared with the project leaders, and the project as a whole will need to be reassessed before further work is done.

Critical Success Factors:

- ✓ Balancing the technology and business expertise on the technology evaluation team
- ✓ Setting appropriate boundaries in the process evaluations
- ✓ Staying connected to the steering committee's vision and strategies
- ✓ Confirming the existence of technology tools consistent with business process recommendations
- ✓ Engaging key stakeholders in business process evaluations
- ✓ Aligning business and technology needs with a realistic set of requirements
- ✓ Ensuring that values and priorities are assigned to various requirements to distinguish "must haves" in the selection process
- ✓ Managing the risks inherent in evaluating business processes
- ✓ Managing the user community's expectations of project outcomes

Land Mines:

- ✓ Being overwhelmed by jargon and exercises in the process evaluations and losing sight of the desired outcomes
- ✓ Focusing process evaluation efforts on insignificant area(s)
- ✓ Becoming committed to a solution before requirements are fully articulated
- ✓ Failing to understand the standards, policies, and procedures within the existing or planned technological environment
- ✓ Failing to consider departmental practices
- ✓ Imposing a technical solution that is inappropriate for business needs

Chapter V
Overview

- Understanding and Communicating the Selection Process
- Issuing a Request for Information
- Reviewing Alternative Strategies
- Appointing a Selection Team
- Issuing a Request for Proposals
- Developing an Evaluation and Measurement System
- Presenting Recommendations to the Steering Committee
- Concluding Contracts with Selected Suppliers

"Even in the case of an internal development solution, a contract should be considered. The implementation of a new financial information system is a crucial undertaking for your institution, and some level of documented agreement can be most useful in resolving potential conflicts with internal as well as external suppliers."

V: Selecting the Solution

Given its substantial immersion in the issues surrounding the investigation of a new or upgraded financial information system, the project management team will have developed insight into the technology trends, the capability and resources of the institution, and possible new directions that should be undertaken. Thus, while the project manager may opt to establish a selection team to develop a request for proposals (RFP) and evaluate proposals, the project management team should maintain its management role throughout this process, particularly in the early stages of confirming or recommending an overall strategy for buying, developing in-house, or partnering to develop a system.

The project must now move from an agreed-upon definition of business and technical requirements to a recommendation to the steering committee for the best solution for meeting these requirements. This phase will determine viable alternatives, eliminate alternatives based on predetermined measurements, identify implementation processes, issues, and costs, and develop documentation that will serve as the basis for a signed contract.

Understanding and Communicating the Selection Process

No two institutions will embark on the same journey and take the identical path. However, the process outlined here can provide a set of reliable and straightforward guideposts for gathering information, evaluating alternative proposals, and documenting the necessary recommendations.

Up to this point in the project, the analysis and discussions have been at a conceptual or philosophical level. During the selection stage the real impact on the institution will become apparent, generating much debate, potential project land mines, and great opportunities to slow the project down.

As in previous stages of the project, effective internal and external communication is a critical success factor. Communication with the campus community needs to be ongoing during the selection process, not start with the announcement of the decision on project sourcing. The importance of keeping internal and external stakeholders informed during this phase cannot be overemphasized.

The steering committee needs to have a close involvement with project progress and issues to deal with potential political implications. Department managers in business and technical areas need to be clearly versed in the direction and possible issues that can have an impact on staff within their departments. The selection team needs to maintain clear communication with any external suppliers under consideration so that understanding and communication can be managed on an ongoing basis. And this team needs to continually validate any assumptions or measurements that will appear in the RFP document to ensure that the statements represent the work of the originating group, be it strategic, business process, or technological direction.

As in previous phases of the project, effective communication will help to manage institution-wide expectations, as critical at this stage as it was in earlier project activities. This is especially true if a paradigm change is involved, such as a movement from internal development to purchased systems, or where there is an expectation of significant reengineering of business processes. Such changes have a direct impact on individuals, so the communication of factual information at every step of the way will reduce the potential of rumors driving the selection process.

Issuing a Request for Information

If the acquisition strategy identified in the steering committee's report is to develop or migrate a system in-house in conjunction with the internal IT organization, the project management team will ask appropriate technology personnel to respond to the project parameters detailed in the requirements document. Assuming their response meets requirements, there will be no need to investigate potential external suppliers, and the team can proceed to establish the measurement parameters and contract for an in-house development project.

If the strategy identified in the steering committee's report is to purchase a product or consider partnering with a vendor and/or other institution(s) to develop a system, the requirements document can be used as the basis for developing a request for information (RFI) to be issued to potential external suppliers. Using the RFI process will facilitate the collection of preliminary information to be evaluated by the project management team in determining potential products for purchase or potential vendor or other partnerships to build a new financial system.

Essentially, issuing an RFI is a way for the institution to say, "Here are our needs; how would you address them?" The document differs from an RFP in that it usually is much less detailed (e.g., it will not include prices or timelines) and is essentially a simpler and less formal way of identifying suppliers who can address your needs, while simultaneously culling out those who cannot.

A good approach to take in developing the RFI is to use a combination of the institution's planning principles and business and technical strategies to produce a three-to-five-page list of critical, priority needs for suppliers to address. These should specify the actual institutional challenges and key functional requirements, as opposed to outlining a proposed solution. In other words, the RFI should take a "just the facts" approach, to encourage respondents to contribute their own key relevant data, eliminating the "fluff" data that can confuse reviewers and impede the evaluation process.

Most of the potential external suppliers and/or partners should have been identified earlier in the project (for example, by the steering committee and the business process teams in their initial environmental scans and the technology team in their "best practices" identification process). This list should be reviewed to eliminate as many unrealistic alternatives as possible, given the specifications in the requirements document. This process is sometimes described as a "knockout process," where particular parameters are used to eliminate one or more alternatives. For example, if the requirements specify that all administrative applications must come from the same vendor, any vendor that does not market a complete suite of applications can be eliminated upfront; if your specifications include client/server configurations, an SQL-supported relational database, a UNIX platform, or DCE-compliant technology, suppliers who cannot address these needs are also readily eliminated from further investigation. In terms of vendors in the marketplace, it is unlikely that the RFI will be issued to more than four to six at this point.

The RFI process will serve as the basis for validating the buy-build-partner decision, while the RFP will serve as the basis for selecting the specific product or partner, as well as a guide for the delivery and implementation of the system.

Reviewing Alternative Strategies

Whether or not the work of the steering committee and other project teams has identified a preferred acquisition strategy, the project management team will need to review the parameters of these alternatives so that a recommendation along these lines can be made to the steering committee in this post-requirements-identification stage of the project.

Some institutions will find a variety of possible alternative solutions for the specified requirements, and the final solution may require some intuitive decision-making based on a large number of inputs and opinions. This is not uncommon in most decision processes. However, the process should utilize objective measurements to the greatest extent possible. This is necessary not only to reach the best possible decision, but also to ensure that the process is perceived to be fair by all internal and external stakeholders.

While variations are possible, the fundamental alternatives include the following:

- Buy an off-the-shelf software product from a vendor if most requirements can be met, planning to work with the vendor to provide any missing critical functionality
- Develop or migrate a system in-house with the internal IT organization to meet requirements
- Partner with a vendor and/or other institutions to develop a system to meet requirements

Buy, Build, or Partner?

Key considerations for a "buy" decision

- Outdated systems creating the need for a "quantum" leap in functionality
- Unstable systems or impending systems crisis
- Insufficient staff resources to build or partner to build a system from scratch and/or resources needed for other projects
- Ability to adjust institutional needs and priorities to match available vendor solutions
- Time frame for completing implementation too aggressive to be met by internal development
- A need for a set of integrated administrative systems
- Affordable costs for maintaining and supporting purchased systems
- Manageable gap between campus vision and off-the-shelf vendor solutions
- Good experience levels in managing vendor relationships

Major advantages of this approach are (1) access to vendor expertise in the implementation effort and in providing ongoing support for users and ongoing enhancements to ensure technological currency; and (2) access to other users' solutions to business process problems with a widely used, proven product.

Key considerations for a "build or migrate in-house" decision

- Satisfaction with the functionality of existing systems
- Stable legacy systems and no impending systems crisis
- High-priority functionality not available in current or near-term future vendor offerings
- Availability of business staff needed to partner with IT staff to redesign systems
- Availability and enthusiasm of adequately skilled staff for assignment to the project
- Campus technology infrastructure, architecture, and strategy in place suitable for new systems development
- A clear understanding of the distribution of project responsibilities (project management, resource allocation, setting of project priorities, and so forth)
- A method for ensuring "best practice" and a strategy to limit scope creep

A major advantage of this strategy is the ability to provide specific functionality required and thus to more readily satisfy needs that will allow campus-driven business process changes (i.e., having it your way).

Key considerations for an external "partner" decision

- High-priority functionality not available in current or near-term future vendor offerings
- Some development capacity on staff, but lack of enthusiasm for total reliance on continuing in-house expertise for core systems
- Vendors and/or other institution(s) interested in and available to form partnerships (vendors willing to make a commitment, other institutions with similar high-priority needs requirements who are willing to compromise/collaborate on solutions) and manageable timing and geographical considerations
- Viable support structures that can be put in place to maintain product after implementation
- Feasible financing strategy
- Appropriate degree of technical compatibility among institutions or technical skills of vendor/consultants

A major advantage of this strategy is the ability to provide most of the required functionality and at the same time share resources and tap into the expertise of a wider range of professionals.

See pages 69-73 for a discussion of additional considerations, with a focus on success factors, related to the alternative strategies for acquiring a financial system, especially in the post-decision, acquisition phase.

Note that all the possible options involve some kind of partnering, which in turn implies shared responsibilities among the partners. The decision to buy from a vendor or to partner with a vendor and/or other institution(s) implies a partnership with the internal information technology organization to help with integration/deployment and technical support. The in-house development option clearly implies a partnership between the IT organization and the financial area.

Based on responses to the functionality and technology requirements of the RFI, the project management team will decide which respondents should be invited for technical and end-user demonstrations or presentations. To help narrow the field, the team should request a list of customers who have purchased the product or used the service with success. Some vendors provide complete customer lists, but quite often this information is not supplied. It is important to identify possible peer institutions who are among the vendor's customers and make contact with them. A key question to ask these institutions with comparable production scalability is whether the system meets their expectations. Unless your institution has the time and/or desire to develop a system or partner with a vendor to do so, you will want to choose products that are already running successfully at similar institutions.

A potential land mine with regard to campus visits by vendors at this stage is that they are usually not yet dealing with costs or timelines, and thus can make "blue sky" presentations that can seduce an audience into buying into the product or service before the project management team can verify the reality of the proposed solution. If the solution does not check out, the team will be in the position of having to disenchant an already "sold" set of users. However, such visits can be very valuable in narrowing the possibilities and testing the reality of the project management's choice of alternatives.

After campus visits have been completed and all information submitted has been reviewed sufficiently to get a sense of whether, and how, the required results will be achievable, the project management team will:

(1) reevaluate priorities, especially if any high-priority functionality was left unaddressed by all respondents;

(2) reevaluate implementation schedule/timing constraints, if any additional information indicates the current strategy may not be viable; and

(3) refine financial projections, based on initial purchase/investment estimates and implementation costs, as well as projected operating costs (support and upgrade requirements).

At this point the team should be in a position to confirm or question the acquisition strategy proposed by the steering committee or, if the steering committee has not made a recommendation in this area, to suggest an appropriate strategy, given the results of the investigation thus far. With approval from the steering committee to pursue the recommended alternative, it is now time to begin a more thorough investigation of the potential vendor products or partners and thus to consider appointing a selection team to carry out the remaining detailed analysis tasks affiliated with these efforts.

Appointing a Selection Team

The project management team will be challenged to move briskly through this next, arduous stage of the project and provide quick turnaround on various issues that will need to be resolved. Tasks include:

- issuing an RFP;
- evaluating the technical content of the proposals received, as well as the vendors themselves and their products;
- recommending a specific solution to the steering committee; and
- developing a contract with the selected supplier.

The project management team may perform these tasks, or the project manager may elect to appoint a subset of the management team to function as a selection team. Whatever approach is chosen, the composition of the selection team needs to include members of the project management team who have been engaged in aligning the business and technical needs into the requirements document, as well as at least one member of the steering committee who can interpret institutional strategic directions as outlined by that body. In addition to these representatives who have been involved with the process in previous stages, the project manager may wish to consider including the following additional representation:

- A representative from the purchasing department or similar post, since the team will benefit from formal process advice as the project nears contract stages

- Representation from the central computing operations and systems areas, since many of the issues that will need definition will relate to day-to-day operations, possible development issues, security and utility software, and validation of report and performance requirements
- Representation from members of business teams that have documented specific requirements for various application areas such as accounts payable, general ledger, payroll, and so forth, to evaluate written proposals or demonstrations of application systems

The team should also include an individual with editorial and publication skills to provide support for developing an accurate and timely RFP document, which can become quite lengthy and require significant revision as the process continues.

Issuing a Request for Proposals

It is important to understand the basic purposes of the RFP because it is usually the driving force and focus of the selection process. The RFP:

- documents the process for responding to the call for proposals,
- clarifies the institution's requirements to enable internal and/or external suppliers to better respond to those needs,
- encourages uniformly structured responses, and
- facilitates evaluation of proposals received.

A significant coordinated work effort is required from all areas of the institution to achieve these seemingly straightforward objectives of the RFP document.

The eventual contract to be signed by the institution and the selected supplier may incorporate the RFP document and the supplier responses to that document. In this way, all of the work that has been expended to develop the RFP and to evaluate actual supplier responses can be used as the basis for ongoing monitoring of contract obligations of both parties. This also underscores the importance of accurate statement of requirements and careful documentation of supplier responses on all points in the RFP.

The RFP is considered to be such a basic element in the evaluation of proposed systems that it is worthwhile to consider how the traditional RFP is composed. Appendix C describes a traditional form of RFP for a selection process concerned with specifying needs, measuring the relative value of these needs, evaluating responses to these measured requirements, and negotiating contracts based on these results. Your institution can adapt this model to your situation, depending on your institutional culture and level of sophistication, based on the key elements in this description.

Just as most RFPs are issued without containing any clearly stated goals and objectives for the performance of the desired system, i.e., what successful performance will look like to the user, they rarely contain any cost limitations either. Stating cost and resource limitations is interpreted as "tipping" the institution's hand to the supplier. It is recommended that cost expectations and considerations as well as human resources limitations and time considerations (e.g., how urgent the situation is with the present system) be obtained from all functional departments and conveyed to potential suppliers. Again, these should be stated in requirement terms rather than as proposed solutions.

It will probably simplify the selection team's task to consider the alternative of developing or migrating in-house systems in partnership with internal IT staff in the same light as external partnership alternatives — the strategies and requirements of the institution are the same for these alternate approaches. While this may seem to overformalize a process that involves people who know each other and who may in fact be members of the team, adopting this approach and establishing equal measures for each alternative will result in a much more informed and objective decision. Thus, although the RFP is usually developed primarily to deal with external suppliers, the process can also be used to validate proposals for in-house development.

Some emerging nontraditional RFP approaches are also worth considering, particularly where the primary goal is to establish a partnership that is based not so much on specific measures, but in the alignment of vision, mission, and common agreements on the value of entering into the partnership. An RFP developed in this way might actually include less in the way of technical specifications and more in the way of defining the outcome expected and requesting the parameters of a partnership that will result in the desired outcome. (See Appendix D for sample partnership criteria used by California Lutheran University in a recent acquisition.)

What is key in this approach is the articulation of the parameters of the partnership itself and gathering information about the values and strategic directions of the partner. This kind of partnership can occur between institutions, between the user office and the IT development personnel within an institution, between a consultant and an institution, between an institution and a supplier with a system product, and so forth. To enter into such a project will require careful analysis of the culture of both the institution and the intended partner(s), development of some measures that will identify how closely the partners are matched, and a method for identifying potential costs and time frames.

Developing an Evaluation and Measurement System

Obviously a critical issue in selecting a financial system solution is the accurate assessment of vendors or other potential partners. This evaluation will run the gamut from concrete analysis of functional offerings at system, subsystem, and line-item detail to looking at the vendor's ability to support the solution envisioned by the institution and its track record at comparable sites or installations. Appendix D provides an extensive list of questions the selection team might use in the process of evaluating both the vendor and its products.

Since a vendor cannot do a full-scale production test of the product at your institution, members of the selection team should make visits to sites of similar production scale that have successfully implemented the product. Extensive performance benchmarks should be run on every product under actual user conditions, if possible, before choosing a financial software product, because all such products will have some performance limitations.

The selection team can create detailed evaluation reports to compare suppliers based on the above evaluation activities. It is also helpful to construct a list of key benefits that would be provided by each solution being evaluated (or ask the respondents to provide this for your scoring and use).

The selection team can also develop an internal measurement and evaluation process to calculate the extent of the gap between your institution's identified strategic, business, and technology needs (level of expectation) and the products and services offered by potential suppliers in their responses to the RFP. The evaluation is very unlikely to result in an exact match, even if the project is undertaken with the purpose of building a system from scratch by internal and/or external partnered resources. The key issue is whether the extent of the gap represents an acceptable solution and what efforts, between internal and external resources, can be brought to bear to minimize the gap.

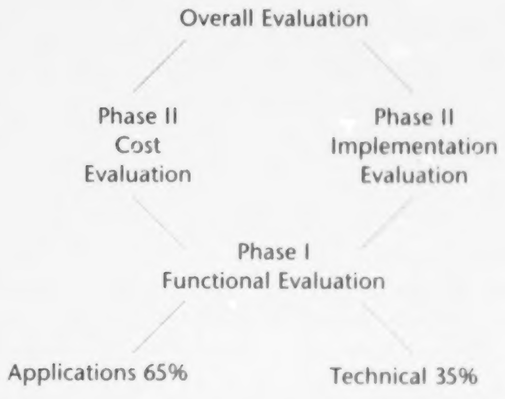
With this in mind, there are many models by which the evaluation of alternative proposals (and resulting gaps) can be measured. Your institution can develop its own model or modify an existing model to reflect the relative value of quantitative and qualitative factors. In general terms it is worthwhile to consider an overall evaluation structure that will allow for specific evaluations of functional issues, provide flexibility to measure the relative values across applications and technical areas, and also allow for subjective judgments with respect to strategic issues and cost factors. Unless a strict cost is associated with the project, it may be worthwhile to exclude that factor from the initial stages of the evaluation.

The initial evaluation should address the functional issues related to application requirements and technical requirements. These items together will identify a system approach that will meet your institution's specified needs. The business and technological requirements detailed in the RFP will offer tangible evidence of the needs for proposed systems to match current functional requirements with the future direction of the institution in the business reengineering or technological areas.

The structure shown in Figure 5 was used by Sinclair Community College to provide an overall evaluation process for its integrated systems project. Note in this case that the weights for functional and technical requirements evaluation are different. This approach reflected a particular philosophy that business requirements should have a higher weighted value than the technical requirements. In a different environment, these values could be reversed or both areas could receive the same value, depending on where an institution placed itself on the futuristic chart.

Beyond the initial level of functional and technical requirements, the team will need to compare the different applications to the technical requirements. There is obviously more than one

Figure 5:
Sample evaluation weights



approach that can be taken to suit the needs of individual institutions based on strategic and tactical directions as well as the culture of the organization. Appendix E includes a detailed model based on the Sinclair illustration above, as well as an alternative model of how measures could be defined for use by the selection team to assist in the evaluation of proposals. A land mine associated with taking such an approach is that it is possible to get too caught up in this kind of weighted evaluation, to the extent of getting the right system on paper but not in fact. If such a device is used, it will be important to use a two-phase process to allow some reevaluation and flexibility in the weights.

Presenting Recommendations to the Steering Committee

Once negotiations within the selection team have been concluded and a solution has been agreed upon by the project management team, the project management team will be ready to present the results of the evaluation to the steering committee. The presentation to the steering committee should be similar regardless of the acquisition strategy. The selection team may wish to adopt the "preferred solution" approach, which allows making a specific recommendation while keeping other alternatives open to the institution in the event that the final agreements and contracts cannot be consummated.

The presentation to the steering committee should include the following key items:

- An introduction that reviews the background to the project and provides a summary of the key findings.
- Rationale for the new system that will recap the reasons that the project was undertaken. (This will reflect the initial steering committee report and the discussions on the need for improvement in the business and technology areas.)
- Review of the overall project process involved in reaching the recommendation, including the teams of people who participated in the various parts of the project.
- Review of the selection process, basically summarizing the steps outlined in this chapter. The review will include the key contents of the RFP, the alternative solutions considered, and an overview of the measurements and weights used to evaluate business, technology, and other requirements. Reference should be made to any reference checks, site visits, benchmarks, on-site demonstrations, and so on.
- Review of benefits of the proposed system in all key strategic, business, and technology areas. Benefits for users in different departments can be summarized, as well as technical benefits.
- A summary of key contract conditions, covering areas such as long-term commitments, hardware, system acceptance, custom programming, partnership arrangements, any other third-party software included in the plan, implementation support, and details on the actual implementation plan.

The financial considerations of the proposal can be dealt with in a separate section of the presentation, identifying the costs for major areas of the project. Some key areas might include the following:

- ✓ Hardware, operating software, and other related equipment
- ✓ Application software costs by module
- ✓ Custom programming modifications
- ✓ Partnership development costs
- ✓ Other third-party software costs
- ✓ Vendor or other implementation support
- ✓ Project management
- ✓ Additional staffing during implementation (for example, for data conversion)

- ✓ Out-of-pocket expenses
- ✓ Outside consultants for any part of the implementation
- ✓ Computer room preparations
- ✓ Additional network equipment or software
- ✓ Printers, terminals, personal computers
- ✓ Other equipment such as cash registers
- ✓ Project contingency
- ✓ First-year maintenance costs
- ✓ Training costs prior to, during, and after implementation, for staff and users
- ✓ Costs of setting up a training facility
- ✓ Costs of backup and recovery during cutover
- ✓ Costs of running the old and new systems in parallel
- ✓ Other . . .

The total sum of the itemized costs will be the proposed budget for the project. Depending on the extent of participation by the institution's personnel, these internal costs may be identified separately in the cost section.

Concluding Contracts with Selected Suppliers

A good contract or partnering agreement satisfies the interests of both sides, is elegant in terms of best outcome for the most efficient and cost-effective effort, is legitimate and beneficial for both partners so neither feels compromised, and includes commitments that are well planned, realistic, and operational.

Contractual arrangements must be completed with assurance that the best possible terms for the institution are realized, including protection against vendor bankruptcy or failure to adhere to conditions. It is important that the steps of the negotiation process contain standard contracting procedures:

- ✓ Prepare a checklist of items to be included in the contract.
- ✓ Review and revise the supplier's standard contract.
- ✓ Review contractual arrangements with appropriate legal counsel.

Besides these basics, successfully negotiating with external suppliers to go beyond standard performance and fit into an institutional culture — for example, using a team approach or total quality management principles — requires negotiations based on satisfying mutual interests. These principle-based techniques[9] involve preparation that includes clear and complete identification of both parties' interests, active listening and description of both parties' expectations and hopes for the contract and partnership, a statement of problem-solving objectives during the negotiation and in the contract, and the forging of a lasting agreement. Articulating these expectations will be easier if the steering committee has developed a set of principles that define the desired partner behaviors and parameters of partnership outcomes.

An essential item to include in the contract is any agreement related to performance, if performance is an item in the requirements and proposals. This can cover the anticipated volumes or transactions, users records, and other items, as well as time frames and procedures for conducting the performance tests.

The contract will reflect the level of detail involved at all stages of the project. If the proposal to the steering committee contains all of the suggested items, the contract will reflect that level of detail. In some cases, as indicated in the discussion on RFP approaches, the contract may be much simpler, reflecting the intent to partner with the proposed supplier. Detailed contracts for this circumstance may be generated later and at different phases of an ongoing project. However, at any time that a formal contract is being signed, the detail in the contract must reflect all of the agreements between the parties.

Even in the case of an internal development solution, a contract should be considered. The implementation of a new financial information system is a crucial undertaking for the institution, and some level of documented agreement can be most useful in resolving potential conflicts with internal as well as external suppliers.

Exact details of the contract will need to be worked out based on the typical contract document of the institution and with appropriate review and sign-off by legal and other counsel as required.

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[9] W. E. Deming, *Out of the Crisis* (Cambridge, Mass.: MIT Press, 1986).

Critical Success Factors:

- ✓ Keeping the RFI simple and free from extraneous information
- ✓ Assessing accurately and objectively vendors and their products
- ✓ Getting feedback from current customers of products under consideration
- ✓ Ensuring that all stakeholders and the community in general are kept informed throughout the selection process
- ✓ Validating assumptions or measurements to include in the RFP
- ✓ Assessing accurately whether the gap between the requirements and a proposed solution is acceptable
- ✓ Regarding internal development as a form of partnership and formally treating it as such
- ✓ Presenting a recommendation within a reasonable timeframe

Land Mines:

- ✓ Committing to a vendor product before thorough vendor and product evaluations can be conducted
- ✓ Failing to consider production scalability
- ✓ Failing to pay attention to detail in this highly detailed process
- ✓ Focusing too much on measurements and missing the bigger picture
- ✓ Failing to communicate expectations to the broader campus community during the selection process
- ✓ Getting "sold" on a product on the basis of a slick demonstration rather than its ability to meet requirements
- ✓ Failing to clearly articulate the parameters of any desired partnership

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Chapter VI Overview

- **Acquiring the System**
- **Implementing the System**
- **Conducting a Post-implementation Appraisal**

> ***"No matter how good the requirements definition or the prototyping, the user will always identify unforeseen design criteria when implementation begins. This is not an indication of flawed design, but rather a natural process."***

VI: Implementing the System

Once your institution has concluded a contract with the selected supplier, two project phases remain: (1) the acquisition phase, in which the solution is either purchased as an off-the-shelf product or developed through an internal and/or external partnership; and (2) the implementation phase, in which data are converted to the new system, users are trained, and the institution cuts over to the new system.

Acquiring the System

The project management team will need to consider a number of issues that will arise for each of the possible strategies the institution may have chosen as the financial system solution.

Considerations in developing or migrating a system in-house

For whatever reasons among those listed previously, your institution may have decided to develop a system in-house. As noted earlier, this solution actually represents a partnership between the information technology (IT) organization and the finance organization. In this case, your institution's information technology personnel will likely have a development methodology they intend to employ in developing a new system or migrating a current system to a new architecture to meet the needs outlined in the requirements document.

It is not the intention of this book to cover in depth the issues surrounding a systems development project; indeed, there are many books available on this topic, and your institution would not have chosen this solution if your internal IT organization was not highly competent to undertake such an effort. There are, however, a couple of success factors and potential land mines to consider.

✓ *Clear leadership roles*

Traditionally, the institution's technology department has been the dominant player in this kind of partnership. Most of the reasons for this are historical and may no longer be relevant at your institution. In today's more complex environment, however, the finance organization must play a leading role in any internal development project to ensure that the business problems will be properly addressed by the proposed system and that the project stays on target and within budget guidelines.

A key question for the chief financial officer to answer is who will be held responsible for the success or failure of an in-house initiative? If he or she is the one, then complete delegation of this responsibility to the IT organization may be a questionable decision. Unquestionably, the chief information technology officer needs to have a major role, but if the accountability lies with the finance organization, then ultimate decision-making needs to lie with the CFO. An argument could even be made that if the CFO or his or her delegate is incapable of leading the project or understanding the technology issues sufficiently to make such important decisions, then the build-in-house option is perhaps not right for the institution. The responsibility lies with the CFO to ensure that such technological sophistication exists in the finance organization before taking on such an effort.

✓ *Clear project milestones with dates*

This advice might sound like motherhood and apple pie, but the reality is that in-house-developed systems are sometimes prone to delays in completion. The reasons for this are legion. It may be scope creep, where the finance organization continually requests additional functionality in the specifications during the development phase. It may be due to insufficient technology resources on the project, or this may be the first use of a certain technology at the institution. While all of these reasons may appear valid to those actually involved in the project, the patience and indulgence of the institution will be eroded very quickly if delays occur.

The project management team must have clear milestones at key points in the project timeline, and the importance of meeting these cannot be overstated. The experience and skill of the project manager (who may not be the same individual who has led the project through the selection phase) will be of paramount importance on this point. He or she must know how and when to compromise, and when to hold firm. There is a school of thought in the IT world that says the probability of success in a development project is inversely proportional to the duration of the project. That has serious implications for a project that cannot keep on schedule.

✓ *Importance of prototyping*

Some consideration should be given to the merit of pilot projects, prototyping, and using small group experiments to test the waters, rather than going for the "big bang" approach of all or nothing, all at once, undertaking so much that there is no chance to find potential problems on a smaller scale. It is far less risky to develop and implement at least one component quickly (for example, on a prototype basis) and work with it to identify potential problems in the approach.

For example, North Carolina State University has successfully used the rapid application development (RAD) methodology to develop several client/server systems through an internal Administrative Computing Services self-directed work team. This protoyping approach enabled the team to quickly develop new client/server-based systems while continuing to maintain legacy systems and respond to ongoing customer requests.

Considerations in buying an existing vendor product

Presumably, the project management team has evaluated the functionality of the vendor's product against the needs requirements documents and has determined that the product can be deployed either intact from the vendor or after some minor modifications. In the latter case, the vendor or the central IT organization may do these modifications, but they are modifications to an existing marketed product and do not involve the same issues as are implied in a partnership with a vendor to develop a system from scratch. The line between the two may be gray in some cases, but each needs to be addressed as a separate option, because certainly at their extremes they have very different critical success factors and land mines.

Issues surrounding this option include: (1) implied process changes for the institution, (2) integration of the IT organization as a critical partner, and (3) establishment of remedy procedures for performance-related deficiencies.

✓ *Implied process changes for the institution*

Probably the most critical factor involved in the buy option is that the campus community understands that it is likely that some processes will have to be changed to match those the vendor has built into the software. It is highly unlikely that the unique requirements of any institution will be addressed completely by an off-the-shelf product from a vendor. Some compromise will be required, and the objective of the project management team is to get the institution to buy into the model represented in the vendor's product enough to relate to it as the "campus system."

It is much less expensive to adapt processes to exploit or leverage the new system than it is to modify the system to fit old methods. A potential land mine (which can be avoided by appropriate communications and management of expectations) is that users may insist on adapting the system to business-as-usual, the old way of doing things, rather than change their own patterns. If this occurs, changes may have to be promoted from the top down; using the steering committee to communicate the importance of these changes can help to ensure that they will happen. It is critical to avoid making major modifications to a purchased system. In software development terms, such system modifications – rewriting code, adding enhancements to existing modules, making site-specific customization changes, and otherwise rewriting the software – will significantly increase the cost, complexity, and duration of a system implementation. Heavy customization can also make it difficult to use the vendor's upgrades as they are issued.

Having to adapt business processes to the purchased system can be a positive outcome. In some cases, the processes built into a vendor product may represent "best practices" in the industry. Sinclair Community College is an excellent example of a case where the needs of the institution were met by minor modifications to an integrated set of vendor products, which enabled the college to make a "quantum leap" in systems functionality. In addition, Sinclair negotiated an agreement with the vendor to incorporate the customized portions of the systems into the product code, thus facilitating future product upgrades.

The most common approach is to balance the costs of creating an exact fit (or the inability to get one) against the time or cost savings associated with buying from a vendor. For some smaller institutions with a limited technology development staff, the buy option may be the only viable one. In many of these cases, moreover, their size and organizational simplicity are an advantage in that there may not be as many conflicting parties whose diverse needs have to be resolved.

✓ *IT function as a critical integration partner*

A buy option is unlikely to succeed unless the central IT organization has agreed to be the integration partner that will perform the necessary tasks to bring in the software. Among these might be setting it up, testing various operational processes, working out backup and recovery procedures, arranging the interfaces with other campus systems if required, and establishing problem resolution procedures to employ when system problems occur.

✓ *Performance-related deficiencies*

The institution should build remedies for product deficiencies into the contract with the vendor. These might be related to actual performance problems such as response times or hardware requirements. More serious deficiencies may relate to actual failure to perform the functional processes of the application. The reference checks with other customer institutions may provide valuable information in this case, including actual contractual documents and information about problems encountered with the software.

Considerations in partnering with a vendor to develop a system

This has not been a very common model in the past, but is increasingly popular in today's higher education information systems climate. One reason for this is that many vendors who are watching their older mainframe applications lose their appeal are feeling severe time and resource pressure as they try to replace them with client/server or networked computing models. For example, Indiana University recently completed the implementation of a financial system developed in partnership with a vendor to meet specific client/server needs that could not be met by host-based solutions. There are a couple of major issues related to this kind of solution.

✓ *Need to share a common goal*

The likelihood of success is increased when the vendor feels that the fruit of the partnership is a product that may be sold to other institutions. Otherwise, the partnership is really just a service-for-fee arrangement. This shared-goals concept, however, brings with it a different set of challenges. Both parties must be amenable to some compromise on functional design. The vendor will undoubtedly be striving for the most flexible (generic) solution, while the institution will want to have its unique needs met. As long as there is trust and openmindedness, this type of partnership can be very successful.

✓ *More complicated project management*

Apart from the obvious personality-related problems that might accompany this kind of partnership, there is the more realistic challenge of project management logistics. If staff members from each side of the partnership are not co-located somewhere, the coordination logistics are likely to be daunting. A preferred model is to have one partner send staff to the other's location for the duration of the project.

For example, Indiana sent three IT developers to the development site of its partner for 18 months. They were set up in apartments, with all utilities paid, and flown home to the University once a month. This seemingly extravagant outlay actually saved an inordinate amount of both out-of-pocket expenses and meeting time during the project. The two senior managers of the finance organization also flew out on alternate weeks to the vendor's site for the duration of the project to provide project management skills and to make on-the-spot decisions on both technical and functional issues. Perhaps the most important advantage of this latter arrangement was to enable the University to retain an active leadership role in the project's management.

Obviously the vendor could choose to send staff to the campus for the project duration, but usually that will be a more costly choice since the vendor would then be charging consultant fees plus travel expenses, and the latter are not under the institution's control. Both partners might want to consider establishing some ground rules about recruitment of each other's staff during the project, a practice that could have very negative consequences for the project.

Considerations in partnering with peer institutions to develop a system

This option is becoming increasingly popular among the alternatives considered by some institutions. The emergence of object-oriented technology has prompted various consortia to band together to develop what are known as "business objects," packets of program code designed to perform a certain function. The theory is that if they can spread the work of developing these objects among a number of institutions, then all can benefit more quickly by assembling the objects to build the locally appropriate system. The Big Ten IT directors are exploring this possibility.

Of course, the more traditional partnership involving sharing the burden of writing the entire system is also a possibility, although there are not many examples where this has been successful. Some pundits have said that while it may be very difficult to reach consensus at a given institution on these matters of systems design, it is impossible to do so across institutional boundaries!

Some special considerations for project management when partnering with one or more peer institutions include:

- establishing a clear understanding of responsibilities (project management, resource allocation, setting of priorities, and so forth),
- coming to agreement on financial liability, and
- establishing agreement on a project plan and methodology for revising the plan before the project begins.

The same issues noted above for in-house development apply here as well, with two additions.

✓ *Interinstitutional legal factors*

There will probably need to be some contractual arrangement among the peers, and care should be taken not to let this step consume too much of the available project time. Obviously the statutory regulations of a state-supported institution may clash with those of a private one, and it would perhaps be wise to test these waters before going too far down this road. One partner may not be able to move as fast as another from a legal standpoint, and that may make the partnership difficult to manage.

✓ *Ownership and support of the system after completion*

One of the common failures in this model is the erosion of support by peers after completion. Some institutions may opt out of the project and the maintenance load will have to be spread over a smaller group, altering the resource allocations accordingly.

Considerations in partnering with both a vendor and peer institutions

As the cost of developing new applications and the pressure to deliver them in shorter and shorter timeframes grows, some institutions are exploring other innovative ways to accomplish the job, for example, creating a consortium of institutions contracting with a vendor to develop from scratch or modify their existing product to the specifications of the consortium. The advantages of this approach are a shared cost and perhaps a greater leverage on a vendor to get the work done quickly.

Vendors do not always have an unlimited supply of the appropriate talent, and the possibility of doing custom work for, say, five or more individual institutions concurrently may be beyond their means. If, however, these colleges and universities can agree on a common set of specifications, then the vendor will get much better productivity out of the collective resources.

A number of such vendor/multiple-institution consortia or partnerships are in the planning stages or under way to develop a financial information system. What is expected to emerge from these partnerships is a vendor-supported system developed specifically for higher education that has the endorsement of a representative group of institutions.

As is the case when partnering with only a vendor, all partners need to share a common goal and project management is more complicated, but the twist on these issues is a little different.

✓ ***Need to share a common goal***

If the partnership of a single institution and a vendor is full of challenges, consider the possibilities of a multiple-institution partnership with a vendor! Some skeptics might say that this approach is fraught with peril because of the difficulties of coordinating all the needs into the specifications of the system. However, the advances in technology and the demands placed on the institutions' CFOs to deliver information may motivate the partners to avoid bringing too many "silver bullet" items to the table.

✓ ***More complicated project management***

All the issues raised in the previous model of a vendor/single-institution partnership are relevant here to an even greater extent. One suggestion that has emerged is to designate one institution as the agent of the consortium and let its representatives deal with the vendor. This, of course, brings with it a large responsibility for the chosen leader. That institution must have the confidence of its partners and also be willing to subjugate some of its own institutional desires to the will of the consortium on occasion. For some, this may be too large a price. The up side of the designated agent is fairly obvious. The vendor cannot play different institutions against each other as much as might otherwise happen. For its part, the vendor only has to negotiate with one institutional partner on scope creep issues and other areas where decisions must be made fairly quickly and clearly.

Implementing the System

The expected outcome of the final phase of the financial system project is the actual implementation of the system. The parameters of a system implementation process are actually unique to each institution. One popular way to define the completion of an implementation is by the date on which the institution's general ledger is operating under the new system. A more general definition of an implementation's scope is that phase of the system project that begins after the computer program code has been acquired (whether through purchase or development) and extends until the system has begun to be used to conduct business. Hairs can be split as to whether the system is "implemented" after the first user is employing it or when the last user has been brought on board, but that is a rhetorical issue. In fact, it is usually difficult to discern when the implementation is over, as implementation for many institutions becomes a multi-year process if additional functionality or new modules are being added to a baseline system.

Nowhere is teamwork more important than during the system implementation phase of the project, because it is in this phase that many efforts begin to come together. Good documentation has to be in place. Training materials and resources have to be ready to go. The functional sponsors have to be ready with support staff. The technical team members need to really be in synch. Networks must be stable, code must be stress tested, and workstations configured, to name but a few of the technical elements. The project manager is in full evidence during implementation: every day, crises will arise and judgments will have to be made that affect the ultimate outcome.

One land mine that arises in the implementation phase is the diverting of technical resources to other projects when the system is viewed as "finished," that is, acquired or developed. It is vital that completion criteria be established so that it will be clear that developers and integrators need to be retained on the project throughout implementation. Design changes and fixes will inevitably arise during this final process, and the system will not be fully implemented until these are made.

As can be seen from the tasks described below, a lot of the implementation work will be done before the final cutover to the new system occurs, but it would be unwise to imply that the bulk of the work is done at that time. If the system has been developed in-house or as part of a partnership, there is a very strong likelihood of discovering bugs and functional deficiencies only after the system is in use by a significant number of users.

The implementation process will vary depending on the solution your institution selects, but a number of tasks, described in the following sections, are common to all solutions in the implementation phase of the project.

Assembling implementation teams

The project management team may elect to create a number of special teams to manage the implementation process. The teams may be made up of the constituent members of the project management team or, more likely, may also include newcomers to the project. Clearly individuals who have been key players throughout the project need to remain key players in the implementation or there will be a serious danger of discontinuity.

Many experienced system developers and implementers say that a system's implementation is the phase where the most discipline, planning, and leadership is required. There are several reasons for this:

- it is very difficult to back out once implementation has actually begun, so a premium is placed on planning for this stage;
- the system is now quite visible to the campus community and is on trial in some ways; and
- decisions will need to be made that cannot be deferred for very long, placing great reliance on the judgment of the project management team.

✓ *System integration team*

A system integration team will be necessary for the implementation phase of the project. If the system is purchased or co-developed with a vendor, the team should include functional, technical, and vendor representatives. Functional and technical representatives alone will constitute this team in the case of an in-house-developed system. Where other options for acquisition have been selected involving one or more institutional partnerships, much more complicated coordination will be necessary at this stage. Usually each institution is implementing the system for its own campus community, and it is during actual system implementation that differences begin to emerge from institution to institution. This is especially true if the partnership involved a co-development effort among the members of the partnership. As is the case with the project in general, the functional unit must take the lead role during implementation and arbitrate any problems that arise.

The primary areas of responsibility for the technical members of the integration team are the application, network, and hardware components of the system. The version control of the application will need to be carefully managed, especially at the beginning. Is the application to be launched from the local hard drive or from a file server? With hundreds or perhaps thousands of potential users, version control of a client/server application is a major administrative challenge.

✓ *Training team*

Almost certainly, the functionality of the new system will be different enough that users will need to be trained. Additionally, the technology used may bring with it the requirement for a separate training program aimed just at that. An example of this might be a switch from terminal-based systems to one using a graphical user interface (GUI). If the new system is based on client/server technology, there will be a considerable learning curve for both the technical support team (see below) and the users on just the hardware and software from a look-and-feel standpoint.

Depending on the scale of the project, it may be necessary to assemble a team of trainers. At a minimum, a training coordinator needs to be identified from the functional area and, if possible, assigned this responsibility at the start of the project, perhaps even to the extent of participating on the project management team. There is a tendency at times to shortchange this implementation area by putting lower-classified personnel on this team. At least initially, the most knowledgeable functional people available should be selected for this training role. Key system designers are obvious candidates, provided they have some requisite training skills. This may seem wasteful at first glance, but most users' first contact with the system will be in these training sessions, and it will be vital to their ultimate acceptance of the system to make this a successful experience. The in-depth knowledge of the design that these key players possess will ensure that the inevitable difficult questions will be answered by those who have the best grasp of the system.

After the system is stabilized, other staff can assume the training duties. The one caveat about this relates to the level of staff being trained. Users usually relate best to someone who is at their level of responsibility. This is a credibility issue as much as anything.

The training team needs to work side by side with the documentation team described below. There may be some complementary possibilities here. Trainers will eventually have some of the best knowledge of the system and how the users have to learn it, and documentation staff will at least have the knowledge of the proposed functionality. There may well be a very blurred line between trainers and documentation staff, and the same people may do both. One way to ensure good documentation is to have an instructional technology specialist write or review the training material.

The training coordinator will need to handle training logistics such as facilities, equipment, and scheduling. This needs to be an individual with considerable initiative and resourcefulness unless the institution has designated a substantial budget for training. The training and customer service responsibilities are often commingled, and in fact doing this can foster a very effective environment. Obviously the knowledge and experience gained in each area complements the requirements of the other area. Staff can rotate such assignments and build a very effective and knowledgeable team.

The institution needs to be prepared to establish this team as early as possible in the project and leave it in place for a considerable length of time after implementation. New staff will need to be trained and existing staff will need both refresher courses and training on new functionality that may be added over time.

✓ *Technical support team*

Depending on the nature of the system (especially, for example, when making a significant technology change), there may be a need for a technical support team in addition to the primary functional training team and program. For example, in a client/server implementation, such a team will support the technical support personnel in the units more than the actual users, because there is a significant system configuration dimension to a mission-critical client/server application that the average user may not want to manage alone.

In addition, central technical staff will also need training. The most significant land mine discovered by Lafayette College in a recent systems implementation that involved new relational database technology was not devoting more time to the training of computing staff in the new technology in advance of implementation. Their experience highlighted for them the importance of taking time prior to implementation to "train the experts to be experts" so that they can later concentrate on learning the new modules and helping users.

If the system is vendor-developed, the vendor may be able to provide training and support materials for technical staff members. On the other hand, if it was developed in-house, there will be a greater burden on technical support staff, because they will not have prior experience to draw upon. This is usually the case in mainframe-based systems, but it is far more significant in the case of a client/server application. The fundamental reason for this is that there are significantly more points of failure in the latter. Dumb terminals never needed configuration. There was only one version of the software operating. The network was rarely stressed, especially if it was a proprietary network implementation. In a client/server scenario, however, every user device is operating the client system, even if the latter is served from a central server. There is also a much larger network burden, both in terms of traffic and in network complexity. All of this places a huge burden on the technical support team.

✓ *Documentation team*

As with any complex system, documentation is a necessary but sometimes neglected aspect. In this era of electronic publishing, online help, and World Wide Web hypertext capabilities, there is increasingly less excuse for not providing good documentation, and it is difficult to imagine a modern system being implemented without it. Training alone will demand it, and documentation should be seen as an integral part of the training process. Vendor-supplied systems will presumably come with documentation, but there may still be a need for local customization of these materials. If the system is developed in-house or in a consortium, the documentation demands will be enormous. They will easily consume a full-time employee for the period preceding implementation through complete deployment of the system.

Establishing a communication process

An effective communication process should be established at the outset of the implementation phase, as a continuation of the communication planning function that has been recognized as critical throughout the project. Such a process will come into even sharper focus during the project implementation phase. If possible, a trained communicator, perhaps from the public relations office or a senior faculty member from the communications department, might be employed to lead this effort to deal with the problems of unveiling a "new system" with all the normal related anxieties and knee-jerk reactions. Keeping all parties informed along the way will help to avoid the "implementation shock" syndrome.

A number of technological aids are available to assist this process, but some of these should be used sparingly. For example, the electronic discussion list concept is a very good way to involve the users group, which can be both an excellent sounding board and a channel for communication as events unfold. More recently, the World Wide Web offers a less intrusive and in many ways a superior means of communication. Your institution could create a systems implementation Web site with various activities focused there such as a newsletter, a functionality discussion forum, a feedback vehicle, and a demonstration section. The University of Idaho found the use of such a Web site to keep users informed of their systems implementation to be a very effective communications device.

Communication with middle and upper managers will enhance a smooth transition to any new system. Although senior managers may not be daily users of the system, it is important to focus on the outcomes that will assist them in their duties. They must be kept informed during the process.

The functional leadership must spend the time necessary to keep all stakeholders informed, and written or electronic communication alone will not work. This needs to be done in personal meetings with the interested parties. This is the place to feature the most positive proponents of the system. If you don't believe in it, why should they?

It is probably not possible to do enough communicating, and project teams should err on the side of over-communicating. Buy-in on the part of the users will be impossible if they are not completely involved and informed.

Employing appropriate management techniques

Solid project management with regular meetings of all players is necessary at all phases of system projects, but perhaps is at a premium during implementation and thereafter. How much project management is necessary is always a dilemma: too little and the project is in serious jeopardy of missing deadlines, going over budget, or not meeting goals; too much and the work may never get done because of the overhead of feeding project management systems. While computerized schedule-tracking systems can help, they must be used with caution.

✓ *Effective team leadership*

More importantly, no project management tool can ever be a substitute for the good judgment of the project leaders and key stakeholders. As in earlier phases of the project, good team leadership is of paramount importance because there will be no substitute for it when the project gets into trouble. No computerized schedule package or set of PERT charts will solve these problems. The team leader will have to know when to relax and when to hold firm, which boils down to good judgment.

A key success factor in the implementation phase is ensuring that project leadership remains balanced and that roles are clearly understood by all parties engaged in the process. If one party (be it the functional, technical, or user area) is missing from or dominates the process, problems will almost assuredly follow.

✓ *Implementation schedule management*

Once started, it is critical to keep momentum going. A long, drawn-out implementation plan, although seemingly safer, can in fact destroy user buy-in. Many practitioners suggest that the schedule should include a small number of well-publicized milestones whose dates are held firm as opposed to larger numbers of less significant ones that may be allowed to slip. The former provides a sharp focus for both the team members and for the stakeholders, while the latter diffuses the importance of a given milestone and may erode overall institution-wide confidence in the team and the project.

Using such milestone agreements is a very effective and inexpensive tool. If the system is being implemented with an outside consultant, progress payments should be tied to the milestones. The same can be done for in-house developers if a chargeback process is in effect.

Managing the implementation schedule is always a difficult challenge, since the project will very rarely go completely according to plan. For most institutions of any size, these projects are typically multi-year initiatives. It will be important in such a situation for the project management team to keep the steering committee informed of any changes in schedule and share the reasons for the changes. The ideal scenario is that the project management team has done a good job of building credibility during the early stages of the project so that the team is trusted when things go wrong.

Planning for enhancements and changes

No matter how good the requirements definition or the prototyping, the user will always identify unforeseen design criteria when implementation begins. This is not an indication of flawed design, but rather a natural process. In fact, in the era of client/server systems, it is almost guaranteed to occur. Responsiveness to these changes is key because the attention of the user is more focused now.

If the system is an existing product supplied by a vendor, then the institution should have essentially adopted a policy that behavior will be adapted to the software. In this case, changes to the system are not likely. However, the newer generation of client/server systems offered by some vendors promise significant local customization, and this puts them in the same mold as in-house-developed systems. For these, there will inevitably be the need to deal with unforeseen changes or enhancements during implementation, and to have a process for managing these changes.

During implementation, the system is no longer in the planning stages – it is actually happening! This is where the stakeholders really show up. Their requirements, priorities, and satisfaction will all come into very sharp focus. Misunderstandings will occur about perceived functionality differences: "This is not what I told you I needed." How the team handles these issues will have a significant bearing on how the users will accept the system in the long run. L.L. Bean has the right attitude here! Unless the suggestions seriously jeopardize the implementation, they need to be accommodated. If the schedule would be adversely affected, then the stakeholders need to be given a complete explanation, and the suggestion must be placed on the prioritized list of enhancements to be dealt with at the earliest opportunity.

Some critics of the inter-institutional development model suggest that the implementation stage is the evidence for why the longer-term benefits of a mutually supported set of code very rarely materialize. It may have been possible to keep the partners together through a design and even a development stage, but when the users at each institution begin to use it and demand local customization, the system can quickly become a unique set of program code that will never again be synchronized with that of the other partners. Hence the importance in a consortial arrangement of establishing change control agreements.

Cleaning up and converting existing system data

Prior to data conversion, some data cleanup will be required. This is particularly true if the old system is of 1960s-1970s vintage. File-oriented systems did not have the cross-editing functionality associated with many of the newer database systems, so data integrity may be questionable. If any files have missing data for some records, that will need to be corrected. Any data element that is going to be a key field in the new system needs to be audited; the need to supply missing data in these cases is critical.

A potential land mine in this effort is that it is possible to get so concerned with the data integrity that the cleanup doesn't get done. The functional area must do some audits of the important data files to be carried forward, make a judgment about when they are "acceptable," and proceed with caution.

Many older systems did not have such things as referential integrity checks built into the databases, and there may be some "orphan" data in the files. When the new system is turned on, and referential integrity rules are applied, errors will almost certainly surface. There will be a conflict here between the data purists and the pragmatists, and the resolution of this issue may require some real leadership and judgment. Implementation could be delayed almost indefinitely by too strict a set of rules; a good compromise is to develop some system assurance reports that can be run after cutover in order to catch the errors and correct them as the system is being shaken down. The exception here is missing data in key fields; those must be corrected.

The reason that data cleanup is necessary is that in most situations, it is unacceptable to implement the new financial system without bringing some of the old system data forward into it. The simplest reason for this is the need to be able to generate reports against the "old" data from both the old system and the new one for system commissioning purposes. Quite apart from the fact that the institution's financial office will need to feel comfortable with the system integrity, the auditors will require this before accepting the new system. A new system, with data from the old one correctly converted, should be able to reproduce reports equivalent to those of the old system.

This conversion of old data can pose a variety of problems. Unlike the new system, the older system probably used a file or nonrelational database structure. This makes data modeling difficult at best, but if data are to be retrospectively converted, they must in some way be remodeled into the new structure.

One way to facilitate this process is to develop a bulletproof set of data conversion programs for each legacy system whose data will be converted. This must be among the most thoroughly tested code in the entire system, because the initial data that will be used will have been converted by it. Those converted data will then become part of the new "historical" record of the institution and be the source of any audits, historical trend analyses, or other activities. However, the team should convert only as much data as will be necessary for operation of the system. A minimum set is one fiscal year's worth. Too much retrospective conversion will drain resources by requiring time to be spent doing cleanup. The campus CFO and the auditors are the best judge of this retrospective conversion need.

Operating the system in parallel

It is almost unthinkable to convert to a new system without some period during which both the new and old systems are running in parallel with data being fed to each. The audit issues alone will necessitate such a parallel operation. A tradeoff almost always exists between the benefits and security of a long parallel systems period and the difficulty of keeping both systems in synch. A minimum might be three months.

In some ways the time period may be less important than the quality of the activities going on during the period, that is, that the players know their roles and responsibilities and that duplicate effort is not occurring. To adequately test a new system in parallel will take significant effort; if that is to be limited to a relatively short period, such as a quarter, then the plan must be very precise. This is not one of those areas where an army of people can be applied to get the job done in a short time. There are probably a limited number of people in the financial offices of the institution who can really validate the system, and their time resource must be used effectively.

Another reason why this period has to be very carefully planned is that in some ways it is going to be the only phase of the effort that has an absolutely firm deadline. The parallel period usually ends with the annual closing process so that the books may be closed with the old system that started the fiscal year. It is this latter requirement that makes the schedule so inflexible. Most auditors will not permit the closing of the fiscal year on a system that was not the one with which the year was opened. As a corollary to that, usually it is not an option to postpone implementation a full year. So, once the parallel period is started, the die is cast.

It is probably very useful to have some hardy "early adopters" outside the finance unit begin to use the system at this stage (for example, departmental business managers). They will test the system better than the finance unit ever could. Their participation will be key during the ensuing sign-off process. There should be a firm schedule of what is to be tested in each fiscal period, and no slippage can be allowed in this phase. This recruiting of early adopters will also conserve the resources of the finance offices for system validation, as opposed to having them occupied doing transaction entry. If these individuals are recruited early enough in the process, they might also serve on one or more of the implementation teams.

There cannot be enough "system assurance" reports during this phase. Consider testing a limited set of the transactions (especially those related to critical processes) during each period very thoroughly, as opposed to testing all transactions every period not so thoroughly. If the source of transactions to be tested in the initial parallel period are controlled carefully, it will be clear what to look for for on the output side of the process. It is important to understand that output might be different between the old and new system, and not to assume that the new output is incorrect, as new systems may be more date sensitive than older ones.

"Rogue" transactions that are not pre-audited can cause very time-consuming analysis. Remember, this phase of the implementation has an inflexible deadline, and there is no alternative to a completed test. It is better to completely test and validate the essential components of the system so that cutover can occur than to try to test every possible combination of transactions and not get the basics done. Thus, an 80/20 rule applies here, too. Validate that the transactions that fall into the 80 percent category will go through flawlessly, and concentrate the analytical time after cutover to watching the 20 percent more carefully.

For in-house or partner-developed systems (i.e., ones that have not previously been deployed elsewhere), there is the danger of a false sense of security on the part of the designers and developers at this stage, and sometimes a tendency for some team members to relax. Designers, developers, and other technical members will feel that their tasks are over for now and they can sit back a little – they have done their testing and handed over a stable, functional set of code. Few developers feel their work is going to be flawed and cause problems! Most seem to think, in the face of all the contrary evidence, that they have written bug-free code and all will be well. For reasons stated above, time is more critical during the parallel testing period than at any other phase and the developers need to be available to quickly make code changes.

Conducting training for all users

For the previous generation of mostly terminal-accessed, mainframe-based systems, technical training was often not an issue. Perhaps the users had accessed other terminal-based systems and so the interface was already familiar. Microcomputer and networked environments bring an entirely new dimension. If users are not already familiar with graphical user interfaces such as Macintosh or Windows, then the training challenges will extend beyond the functional areas related to the system. Separate sessions may be necessary just to train people on how to work in a mouse-driven environment. Some institutions have gone so far as to mandate that users attend training before they will be given access privileges to the system.

The functional training is also going to be more complex with networked technology, because the nature of the applications is different, using event-driven systems. In particular, navigating the myriad screens of a client/server system can be daunting unless the users have been adequately trained.

Some suggestions for effective training include:

✓ Try to set up a semipermanent training facility, well equipped with the necessary hardware and software. This may seem like an expensive proposition when the proposal for the latter is presented, but the consequences of bad training on the user base will far outstrip such setup costs. For example, while Indiana University invested in a training facility and conducted exhaustive training for the users, a post-implementation appraisal revealed a widely held view that there had not been enough training! Further analysis disclosed that the relative complexity of the client/server style transactions presented a very steep learning curve to the users. In retrospect, the University felt it should have had an even larger training site, or even multiple sites. This was despite an acknowledgment from the users that there had never been a system implementation with such comprehensive training plans.

Parenthetically, there are very few wasted resources associated with these kinds of training facilities. After implementation, the space can be returned to the institution, and much of the equipment may end up being used for other purposes, so the cost is not a complete write-off.

✓ As recommended earlier, appoint a full-time training team leader. Personnel from the prospective customer service organization are good candidates for training duties since they will inherit the post-implementation burdens of help-desk operation. They may draw on "faculty" from diverse areas to do the actual training sessions, but having customer service coordinating the effort may be a worthwhile investment.

✓ Provide clear and concise written material. Much is to be gained if individuals can answer some of their own questions, thereby saving the time of the trainers as much as possible. The class attendees will not retain a very large portion of the class content and will need to be able to refer to very good documentation days and weeks after the training event(s). It is important to have both electronic and printed copy of materials. The new users will perhaps need the latter during the initial training, but keeping documentation updated as versions change, new functionality is added, and so forth will prove almost impossible. Fortunately a number of attractive alternatives are available for most institutions today. The campuswide information system – especially if it is based on the World Wide Web – is a natural location for publishing and maintaining such materials. The hypertext-link features offer a functionality that never existed before.

✓ Conduct just-in-time (JIT) training, or the retention of trainees will be almost zero. Even a few weeks between training and actual operation may be too much for some users. Attendees should be able to go back to their offices from training and be able to access the system. (At Indiana University, the actual period while staff were at training coincided in some cases with the activation of their systems for its use. Technical staff configured their workstations while they were away at training for half a day.) Of course, support resource constraints may affect these decisions, but the goal needs to be JIT training!

✓ To facilitate users being able to apply what they have learned in class, have a practice version of the system available during a short period after the class work, but also before the actual graduation to production. Obviously class members cannot practice on the live production files, nor can they be expected to do very much with unrealistic test data. One approach is to replicate the system in a second server and refresh the data in it periodically so that they are a good approximation of the real thing. It goes without saying that the versions of the system in both practice and production servers should be the same.

✓ Consider getting professional help in setting up the training itself. Most financial accounting personnel are neither natural trainers nor creators of training materials. At Indiana, the campus training staff were engaged to develop the sessions and a professional writer was hired to do the training material production and system documentation. It proved to be a very worthwhile investment in that the writing quality was superior to what the regular finance staff could have done, and there was a continuity of style that proved helpful to the users. Wellesley College also hired a professional writer to do all of the documentation for its new systems. While a smaller institution might not immediately think of taking such an approach, it is even more important to seriously consider doing this. At a small college, it is likely that the same few "players" are already on multiple project teams. Getting some professional help for a task easily outsourced can be a very wise strategy to save staff from being stretched too thin.

✓ Consider the concept of a distributed support model across the institution. "Train the trainers" is a typical process in this case, where a champion of the system is selected from each departmental unit and given intensive support and training by the central finance unit. They then become the first line of support for their individual unit. If the resource issues associated with such a plan can be overcome, the benefits derived from increased local expertise will be dramatic. Lost time alone, waiting for an answer from a central unit help desk, will be virtually eliminated. In the first years of operation of a new system, that can add up to significant productivity savings.

✓ Evaluate general workforce skills, which will have a huge bearing on implementation. If the system features a graphical user interface and the workforce are all largely using character-based devices, there will be an additional training effort that is not directly associated with the system. In that case the central information technology organization may offer classes in various workstation-related skills that can be leveraged. It may even be appropriate to require such "prerequisites" before attending the actual functional training.

In addition, the advent of client/server systems places a premium on local technical support skills. Make sure that the technical coordinator who will install and support the system in the unit is well trained. It may even be advisable to have a separate "users group" for such staff where only technical issues are addressed.

Establishing a functional users group

As mentioned above, the in-house or partner-developed system will almost never go into production, completely finished, without need for enhancements or addition of other modules. The danger here is that every user feels that his or her enhancement request is the most important one and expectations will quickly get out of control. The developers will not be able to effect all such changes immediately. A functional users group can be of great assistance as the body to prioritize these activities.

The group should be led by a user from outside the finance organization. However, the latter needs to ensure that the group stays on course and has a purpose at each stage of the implementation, setting the agenda and the pace and ensuring that all potential opponents of the system are part of the users group. It is better to try to deal with users in the open forum of such a group than to have them taking potshots from the sidelines.

One common suggestion is to make the most vocal critic the chair of such a group. Judgment will dictate the right course in this case, since the effect of such an appointment could be either positive or negative, depending on the personalities involved.

If the users group does not have a focus, it can be a very negative force in the implementation process, by serving as the lightning rod for discontent. Concentrating on "bug" or functional problem resolution and prioritization of enhancements is a proven way to maintain this focus.

Remember, the implementation stage of the project is much more stressful on users than on technical staff. Users must deal with changed inputs, processes, and outputs, and many more people having access than in the past.

Establishing help-desk support

A help desk with well-trained staff is key to a successful implementation. If this was important in previous generation systems, it is vital if the system involves a change in both functionality and technology. The usual customer service function that many institutions have in place for an older, mature system may not suffice for the level of requests that will occur.

The help desk needs to be able to address questions about both the functional and technical aspects of the system. It may not be necessary to have people who have the answers to all possible questions, but somewhere in the support function that knowledge must exist, and the help-desk support staff need to know where. It is very important that potential help-desk staff be an integral part of the pre-implementation process. If possible, they should have been members of design teams if the system is developed in-house. If it is a purchased product, they should have been on the selection team. Most importantly, they must be a part of the training process. As stated earlier, it may make sense to have the help-desk manager also be responsible for the actual training. The logistical issues alone associated with scheduling and setting up training will surely cross over to the help-desk staff.

Another critical success factor will be the establishment of a "knowledge base" or problem-tracking database. This kind of application facilitates the sharing of knowledge on previously solved problems and will be of increasing value after implementation. The technology of such knowledge bases has improved dramatically, and the functionality of the World Wide Web is driving much of that change.

One potential land mine is staffing the help desk with people who do not really understand the "why" of the transactions or features of the system, but only the "how." Not only is their value in this kind of complex application diminished, but this lack of understanding can actually have a negative impact on the help-desk support. That is why it is important to have them involved up front in the design or acquisition. After all, the help desk is the point of interaction with the service provider for many users of the system, and their perception of it will depend on how well the staff performs. This will be especially true if the distributed support model is being considered, since the likely calls to the help desk will be from reasonably well informed local support staff who presumably understand the basic issues and are only contacting the help desk on difficult problems.

Getting key stakeholder sign-off

Assuming that the system has passed the test during parallel operation, there has to be a salient buy-in from at least some of the key players at this stage. The system needs to be seen as belonging to the institution, not to the finance organization. The steering committee should also formally endorse the widespread deployment of the system at this time.

If there is an optimal time for the president or chancellor to vocally express support for the initiative, this is it. Expressions of support at any time from project initiation forward are welcome, but with all the unforeseen hurdles that will need to be overcome at actual implementation time, the high-level support at this juncture will be invaluable.

If the representatives of a few schools or departments have been made "early adopters," their endorsement should also be sought now. Have them participate at communication sessions, and carve out a real role for them in that process.

Internal auditing can be an invaluable partner with their knowledge of the various possible soft spots and pitfalls. They should have been an integral and active part of the testing process and should sign off on the integrity of the system at the end of the parallel test period.

Don't wait for everyone to sign off on the system. The endorsement of a smaller number of key players is more important than widespread consensus.

Cutting over to the new system alone

With the increased dependency on technology, an obvious task before cutting over to the new system is to take snapshots of data, in the event of a disaster and the need to go back. That is perhaps one of the most compelling reasons why the cutover takes place at fiscal year end. The snapshots have to be at the various levels of detail that would enable a recovery. At the very least, balance totals for object codes (income and expense classes) should be captured. This will probably be automatic if it is being done at fiscal year end.

When the actual cutover day arrives, it is important to understand that for all practical purposes, there is no going back. The costs attendant on such a move are likely very high. For most institutions, if the cutover occurs at fiscal year end, a significant delay may mean a one-year delay. However, if the implementation plan and the parallel testing have been done correctly, this will be a huge anticlimax. No one will notice except the finance organization.

The cutover to the new system can be accomplished in a number of ways, but it will usually fall into one of two basic types — a simultaneous cutover of all components of the system at once, or a phased implementation of components.

Full-fledged cutover at once of all components — transaction processing, general ledger, and associated components — is a very difficult proposition for many institutions and may only be possible when the number of users is very limited. The reason for this relates to the scale of the training required to accomplish it. The prospect of having to train hundreds of users in the use of the new screens for transaction processing in a very short time makes it virtually impossible at a large institution. The idea of JIT training would probably be impossible with so large a number of users. The technical coordination and workstation configuration alone might prove too difficult to address.

Having said that, there is no doubt that if it is possible, a onetime cutover to the entire system by all users has real payoffs. The benefits of the new system will be realized by all from day one. The reallocation of finance and other support staff will be shortened in time. The impact alone of the implementation being done all at one time will really focus the attention of the institution and make for a very visible beginning.

However, numbers of users and/or their different levels of readiness may make it practical to phase in the use of the new transactions department by department and have the other documents sent to a central data entry area where well-trained staff can do the input until the training process is completed over a longer, more manageable period. This minimizes the severity levels of first-day problems for the finance and technical support staff.

The general ledger poses an entirely different problem. It is usually not possible to manage two ledgers for any length of time, so the only possibility is to cut over all data to the new G/L at one time. Half the institution cannot run on one set of books and the other half on another.

This presents a training challenge, but one more manageable than the prospect of bringing the entire user base up on the transaction system at once. The problem essentially boils down to training staff on the use and interpretation of the new standard reports, and this can be accomplished by a series of educational sessions held over a period of no more than one month, usually the last month of the parallel operation. This gets the institution onto the new general ledger in one move and offers the best chance to bring it quickly to a stable mode of operation. The implementation of the transaction system can then proceed in an orderly manner dictated by training resources and organizational readiness. Of course, during this phase-in period, the central accounting functions will have to shoulder the data entry burden of those units not doing their own transaction data entry.

It is important to remember that the only thing that has to happen is that at the end of the next fiscal period the books can be closed again. If some transactions have to be entered by the accounting department from paper copies or "batched" in for a month or two, that may be acceptable.

The greatest danger related to cutover is that there will be too much caution and this day will be postponed indefinitely. Those waiting for perfection will be like those waiting for Godot. Judgment is critical at this point. The system must be of sufficient integrity to go live, not necessarily to be perfect. The reason for this is that the period of greatest learning and adjustment will be right after cutover, so strive to get there as soon as possible!

A critical success factor for in-house or partner-developed systems is ensuring technical competency at this stage of the project, more than any other. During the design and development phases, technical decisions are always being made, but during implementation they have to be made more quickly and correctly. The system cannot be "down" for too long or the users will lose confidence in the entire process. This is when the technical competence of the developers and the judgment of the project leadership are at a premium.

Conducting a Post-implementation Appraisal

This process should be broken into at least two separate phases. The first will be simply a check that the system is actually operating successfully for the users from the outset. The help-desk staff who did training and implementation consulting may be best qualified to do this, for example through online surveys, questionnaires, and so forth. The second and more critical evaluation – performance of the system – may not take place for some months or perhaps a year after implementation.

For users, the system must do what it is supposed to do. For management, it must not only do that, but it should also be completed within or close to budget. Many project managers seek to do post-implementation appraisals for "learning" purposes. The typical question asked is, "What would we do differently, if we had to do it over again?" For most people in the functional area, this can be a real waste of time. The reality is that most of them will not be around when such a project is repeated, and even if they are the rules will have changed so much that lessons learned may be obsolete. It may be of value to the technical organization, who may be looking ahead to another system implementation, but even in that case, the issues will perhaps be so different that the value of the experience may be questionable. The exception to this may be if the project was the first to use a new technology (such as client/server), a distributed data model, or perhaps a relational database management system. Then the lessons learned will be well worth documenting for the future.

For the finance staff, the real appraisal that occurs is the next year's closing process with the attendant audit. The latter will be focusing on both the financial reports and the actual operation of the system from an accounting integrity perspective. The positive side of this auditing process is the value of a clean report validating the use of the system. Wellesley College used its external auditors to audit the proposed system prior to and after implementation, so that it could report back to its governing board. This was different from, and in addition to, the auditors doing their audit of numbers and signing off that the new system was an appropriate transition from the old. In Wellesley's case, this system audit was actually done by the auditing firm's technology team, rather than by the auditors.

Another example of post-implementation appraisals that may take place is an independent assessment by senior management of the benefits derived from the new system. Indiana University commissioned a Big Six consulting firm to do such an assessment a year after initial implementation. It provided a number of significant benefits. The attention of the institution was focused on this initiative and it gave the users a real opportunity to air any concerns they had to an independent party. Such an objective evaluation can also help to focus on what else may need to be done to realize the full value of the institution's investment. Again, the value of getting a positive assessment is well worth the time and energy devoted to supporting such an independent appraisal.

It may be worth noting, in conclusion, that no bell is rung when implementation is completed, since it may never be quite complete. Here again, the difference may be based on whether the institution bought or developed a system. In the case of the former, the institution may or may not elect to make upgrades to the vendor's package by purchasing a maintenance contract. One reason it may not is the possible high cost of such a contract. If, however, the system was developed in-house, a continuous process of refinement will likely be the norm and the institution needs to be sure to provide the base funding for such efforts.

Some experts think that the current upsurge in financial systems replacement is due to their neglect over the years as other initiatives took precedence. With continual changes in funding policies and management techniques, it may be prudent to ensure that campus financial systems are kept more in synch with such changes over the next decade.

Critical Success Factors:

- ✓ Making sure the system is seen as being owned by the institution, not the finance organization
- ✓ Avoiding "implementation shock" by keeping the community informed every step of the way
- ✓ Establishing an effective partnership with the IT organization, regardless of type of solution
- ✓ Establishing a clear plan, financial liability, and change control agreements in a partnership/consortium
- ✓ In a system development, testing the waters by developing in "chunks" or prototyping
- ✓ Establishing and meeting clear milestone dates
- ✓ Ensuring that key individuals remain involved throughout the implementation
- ✓ Clearly articulating where the accountability for the success of the project lies
- ✓ Ensuring that the project leadership stays balanced and that roles and responsibilities are clearly understood
- ✓ Being willing to compromise when necessary
- ✓ Understanding the importance of just-in-time training
- ✓ Dealing effectively with unforeseen changes or enhancements
- ✓ Operating the new system in parallel with existing systems
- ✓ Auditing data elements in key fields and supplying missing data
- ✓ Providing good technical support or training for technical staff
- ✓ Establishing completion criteria so that developers and integrators can be retained as long as needed
- ✓ Ensuring that technical competence is readily available in the cutover stage
- ✓ Ensuring that high-level, knowledgeable personnel conduct training
- ✓ Establishing a problem-tracking database
- ✓ Establishing a help desk with well-trained staff
- ✓ Using "early adopters" to test the system

Land Mines:

- ✓ Allowing "scope creep"
- ✓ Erosion of support after project completion in a peer-institution partnership
- ✓ Diverting resources before the implementation is complete
- ✓ Bringing "silver bullets" to the table in a partnership with other institutions, i.e., requiring too much customization in a consortium arrangement
- ✓ Allowing the functional or technical area to dominate the implementation process
- ✓ Long, drawn-out implementation that continually misses milestone dates
- ✓ Getting so concerned with data integrity that the cleanup doesn't get done
- ✓ Staffing the help desk with people who don't understand the "why," just the "how"
- ✓ Exercising too much caution in cutting over to the new system (it doesn't need to be perfect)

VII: Conclusion

As the authors of this book approached the idea of providing guidelines for planning and implementing campus financial systems, we were struck by the challenge of trying to address a moving target in a diverse and dynamic environment. There were many reasons not to tackle such a book, among them the rapidly changing – and often unproven – technology that institutions have available to them, and the complexity of not being able to prescribe definitive solutions for such a diverse audience from many types of campuses. In short, we were very concerned that we would be addressing an area where the rules seemed to change every few months and where there were no common solutions.

But those concerns proved to be why we felt writing this book was essential. College presidents, business officers, information technology directors, and others have become overwhelmed with the daunting task of how to organize themselves to make some critical decisions about the future of their campus information systems. If there is a more complex organization for which to develop such systems, we would love to hear what it might be. We agreed that if we provided some guidance on how to undertake such an arduous task we would have done a worthwhile service for our colleagues.

If you have taken the time to read this book, you have already begun a challenging journey for which we have *not* provided cookie-cutter solutions and single "right" answers! As authors we represent very different types of institutions, and it became clear to us that to attempt to describe a single answer would be unwise and unfair to our readers. Rather, we have attempted to describe a set of processes that we hope will help you begin to reveal your own set of answers.

Some of the solutions you identify will be appropriate in the short term. Other answers will be applicable in the longer term. Some conclusions will be dependant on the nature of your current investment in legacy systems, on your motivations for developing a financial system, or your willingness to make radical changes in your business processes. But even with these variables, we are convinced that if you follow the process we have suggested in this book, you will come to the best conclusions about what is right for your institution.

As you begin the journey towards a new financial system, remember that the journey cannot be made by you alone. Your traveling companions must include financial and technical professionals, providers of information, and users of information. If you follow the book's advice, you will develop close partnerships that represent the needs and wisdom of these essential players in the process.

It would not hurt to reiterate our warning about reviewing business processes on the campus prior to making decisions about your next financial system. Reengineering has become a tiresome buzz word to many, but you will do yourself a terrible disservice if you install a new financial system that automates the way you have conducted business over the last 20 years. Colleges and universities have a nasty propensity to accumulate procedures, steps, and hierarchies over time until they find they can no longer afford them. It will become even more costly to re-tool your new financial system if you wait until later to change key business processes.

Remember that the goals of your institution, including your business requirements, should be the driver of your journey. While technology and the marketplace will play a central role in many decisions, your institution's business needs should be the context for technology decisions. In the rapidly changing technology market, you will only help yourself by keeping your options open and avoiding painting yourself into a proprietary corner. And, finally, as you set off on your journey, try to keep your sense of humor. You will need it!

Appendix A: Sample Planning Principles

Information Technology Principles, The University of Pennsylvania

The principles below state Penn's beliefs about using information technology to solve business problems. There are 26 principles in five categories: an overarching general category, data, applications, infrastructure, and organization.

For each principle, a rationale is stated and specific implications listed. The principles are a link, a bridge, between the business people and the technologists. They attempt to make assumptions explicit, which helps both sides identify points of conflict and perhaps start resolving them. The principles are the foundation on which the architectures, policies, standards, plans, and systems are built. They're a stable base that lets those other components be as flexible as they need to be.

General

1. *University assets.*

Information technology infrastructure, business applications, and data must be managed as University assets.

2. *Functional requirements.*

University priorities and business functionality determine investments in administrative information technology.

3. *Cost-effectiveness.*

Information technology must contribute to the cost-effectiveness of the business functions it supports and must be cost-effective from the perspective of the University as a whole.

4. *Policies, standards, and models.*

Policies, standards, models, and methodologies — based on the principles outlined here — govern the acquisition and use of data and information technology. Regular update and communication are required.

5. *Investment criteria.*

Investment decisions (even those not to take action) must be based on business needs, cost-effectiveness, and consistency with standards and models.

6. *Training and support.*

Penn must put sufficient effort into ongoing support of its information technology assets. Skills and experiences from across the University must be leveraged and communication channels opened.

University Data

7. *Accuracy.*

University administrative data must be accurate and collected in a timely way.

8. *Security and confidentiality.*

University administrative data must be safe from harm and, when confidential, accessible only to those with a "need to know."

9. *Ease of access.*

University administrative data must be easy to access for all groups of authorized users regardless of their level of technical expertise.

10. *Multiple uses.*

Penn must plan for multiple uses of University administrative data, including operations, management decision-making, planning, and ad hoc reporting.

11. *Purposeful collection.*

A given set of data should be collected once, from the source, and only if there is a business need for the data.

12. *Common base of data.*

A common base of data must be created to facilitate sharing, control redundancy, and satisfy retention requirements.

13. *Documentation.*

Detailed information about University administrative data must be created, maintained, and made available.

Business Applications

14. *Ease of use.*

Applications must be easy to use for both novice and expert users. Interfaces should be similar enough to present a reasonably consistent "look and feel."

15. *Adaptability.*

Applications must be easily adaptable to changing business and technical requirements.

16. *Data sharing.*

Applications must use a common base of well defined University data and reference a common repository.

17. *Ensuring data quality.*

Applications must help ensure valid, consistent, and secure data.

Infrastructure

18. *Common communications infrastructure.*

Academic functions and administrative systems must share common data, voice, and video communications infrastructures.

19. *Connections within the University.*

The communications infrastructure must be standardized to allow reliable, easy interaction among individuals, work groups, departments, schools, and centers.

20. *Connections outside the University.*

The communications infrastructure must comply with national and international standards that allow reliable, easy interaction with those communities.

21. *Hardware and software choices.*

Hardware and software for administrative use will be limited to a bounded set of alternatives. This applies to desktop computing, application servers, communications components, application development tools, and data management tools.

22. *Emerging technologies.*

Penn must devote appropriate, coordinated effort to evaluating and piloting emerging technologies.

Organization

23. *Data stewards.*

Data stewards are responsible for ensuring the appropriate documentation, collection, storage, and use of the administrative data within their purview.

24. *Process owners.*

Process owners are responsible for developing and maintaining the standards, structures, and business applications that ensure the quality and cost-effectiveness of specific business processes.

25. *Information Systems and Computing (ISC).*

Information Systems and Computing provides leadership, infrastructure, standards, services, and coordination that permit Penn to take full advantage of its information technology assets.

26. *Schools and administrative centers.*

Schools and administrative centers are responsible for creating data and using information technology to meet the objectives of their organizations.

In addition to these planning principles, Penn has developed three architectures – information, business systems, and technical infrastructure – as models, or frameworks, from which will flow policies, standards, plans, and systems. The architectures themselves flow one from the other:

- The *information architecture* includes an enterprise-wide data model to help Penn understand what data it needs. That's mapped against an enterprise-wide process, or activity, model that helps us understand what the organization is doing. Reconciling the two ensures that actions will be supported by the right data.
- The *business systems architecture* lays out the comprehensive set of information systems and data stores that are needed to carry out Penn's specific business processes. The systems are identified without regard for what's already in place or how the pie is currently sliced.
- The *technical architecture* is a blueprint of the hardware, software, and communications components that will be necessary to implement the first two architectures. It's not a buy list, but a model from which standards and products can be derived.

These principles are excerpted from a paper by Linda May, Janet Gordon, Robin Beck, and Noam Arzt, "Architecture and Reengineering: Partnership for Change at the University of Pennsylvania," in *Proceedings of the 1993 CAUSE Annual Conference* (Boulder, Colo.: CAUSE, 1994), pp. 145-154.

University of Colorado Financial Management System Principles and Assumptions

(Excerpted from *University of Colorado Financial Management System: Request for Proposal*)

The University of Colorado has identified eight principles to assist in planning for a new financial management application system. Included as appropriate are assumptions made by CU in conjunction with development of these principles. These principles are subject to change based on further planning of the financial management system and general strategic direction of the University.

Principle: Flexible Systems

A financial management application is needed to support efficient, effective financial management and continuing business process improvement.

Assumptions:

- The financial management application system will have the flexibility required to support the above principle.
- Implementation of a new financial management application system will bring immediate improvement in the University's efficiency and effectiveness.
- The financial management application system will be built on a relational database management system (RDBMS) that will allow for additional flexibility in accessing data and extending the database.

Principle: Client/server Technology

Client/server technology is the optimum current and long-term application architecture for the University's computing.

Assumptions:

- Client/server technology is sufficiently developed at this time for the University to implement a major application system.
- The University will train and equip users and technical staff to effectively use and support application systems utilizing client/server architecture.

Principle: IT Standards

The University will establish and support standards for hardware and software, development processes, and IT infrastructure components to promote effective, efficient deployment of client/server applications.

Assumption:

- Standards will enhance, not limit, users' ability to do their work by creating efficiencies, especially in the following areas: (1) user training, (2) technical support, (3) systems connectivity, and (4) volume purchasing discounts.

Principle: Integrated Systems

The University will use integrated application systems to reduce the need for reconciliation and management oversight as control mechansisms.

Assumption:

- Currently available financial management application systems have sufficient integration to accomplish the University's objectives.

Principle: Buy Not Build

The University will buy, not build, standard financial management application systems.

Assumptions:

- Vendors currently have client/server financial management application systems that are sufficiently developed to meet core University needs.
- Campus-funded staff (whether located at University Management Systems or on the campuses) will create and maintain campus-specific modules according to the University-wide system development standards.

Principle: Match Functional and Data Requirements

A major criterion in choosing a financial management application system is how well it meets the University's functional and data requirements.

Assumption:

- A high-level analysis of functional and data requirements, coupled with vendor presentations, will provide sufficient information about how well an application system fits the University's needs.

Principle: System Changes

We will not change the basic code of the financial management system.

Assumptions:

- We will implement the FMS with no modification to the basic code because its flexibility will allow us to meet our essential needs without major change.
- As we implement the new system, we will make sufficient modification to the business processes to enable effective use of the application system.
- The system can be enhanced sufficiently to meet process improvement objectives through the use of configuration features of the application system and through extensions of the system using client/server technology (personal-computer-type software integrated with the application system).

Principle: Data Capture

Data is captured at its source.

Appendix B: Glossary of Terms and Concepts

Analytical processing/online analytical processing

This term was coined by relational database pioneer Dr. E. Codd to describe activities performed on data that are analytical in nature, as distinct from operational or transactional in nature. Analytical processing is also referred to as online analytical processing (OLAP), and operational or transaction processing is also referred to as online transaction processing (OLTP). Contemporary thinking suggests that improvements in computer system efficiency and functionality are achieved by separating analytical processing from transaction processing activities. This is because (1) such systems use different underlying technologies (hardware and software) that are optimized respectively for either transactions or decision support and analysis; (2) software tools to support analysis functions typically evolve faster than those that support transaction processing, so separating such functions allows their users to assimilate changing technology more cost effectively; and (3) data in transaction systems are frequently difficult for end users to work with and are rarely historical, suggesting the desirability of developing different data management approaches (see, for example, data warehouse) for the purposes of management analysis and reporting. A wide variety of software tools have been developed to support analytical processing. Such tools include statistical packages, spreadsheets, report generators, graphical packages, relational databases, and multidimensional databases.

Client/server technology

Client/server technology represents a major milestone in the migration of data processing from centralized, host-based computing systems to distributed, networked computing. Client/server technology is based on a software partitioning paradigm in which a distributed system (which could also be portions of a central system) is split between one or more server tasks. The server is usually a networked computer providing service to multiple clients, typically desktop computers in end-user departments.

The goal in dividing these tasks is to create a balance of appropriate work on both the client and server computers, while minimizing network traffic. Client/server technology provides opportunities for increased flexibility in responding to user requirements by taking advantage of low-cost hardware technology, combined with network infrastructures and advanced application development and database management tools. Implementation of the client/server technology may increase the responsibility of end-user departments for the data processing operations, procedures, security, recovery, and maintenance of the resulting systems.

System development for client/server technology is more sophisticated than system development in the centralized or distributed computing environment. Client/server is not a single technology. Its implementation will vary based on many design factors involving hardware, software, application development tools, and the sophistication of end users and technical development organizations. Systems development can also involve business process reengineering, where the application will be redesigned to take advantage of process improvement and quality management inputs.

While client/server systems connote distribution to the division or department level, the design of such systems needs to be based on an institutional information architecture and infrastructure, since client/server systems need to coexist with other systems. The tasks that will be distributed to the client and server environment are the tasks typically contained within the traditional central data processing functions – presentations (screens, graphical user interfaces), the processes (the application tasks such as "compute balance" or "calculate federal tax"), and the database. The database, while operating in a particular client/server environment, needs to be available at the institutional level. The extent to which these tasks will be distributed to the server or client platforms will be determined by the design of the particular system.

Current developments in the client/server arena are dependent on an institution's internal network structures and resources ("intranet"). Future developments may include use of external network structures and resources (such as the Internet) to deliver typical server functions to client platforms.

Data mapping

Data mapping is the process of aligning data elements in one database structure with the data elements in a different database structure and resolving possible conflicts in the definitions and content of those elements. Data mapping is a significant implementation issue when migrating or transferring data from one database system to another (for example, from a nonrelational legacy system to a relational database system).

Data elements in the two databases may appear to be the same data, but may in fact have a different meaning or connotation. Fields such as Cumulative GPA or Student Account Balance may have the same description, but contain different information. Resolution can involve review of the application code that creates the data to determine if the elements are the same. This issue needs to be dealt with in the implementation of any new system solutions, whether building or buying, when the new database structures are different from the old ones.

Data warehouse

Increased emphasis on information access for decision-making purposes and the availability of low-cost, high-speed technology has permitted the creation of databases that can be used for query purposes or for browsing while resolving the traditional issues of impact on the day-to-day performance of the main systems. Data are extracted from the main database on a periodic basis and are available in the "data warehouse" for use in decision support and executive support systems.

Tools that access a data warehouse are usually more flexible and intuitive than interfaces to legacy systems and thus simplify access to and retrieval of information by nontechnical personnel. Campus financial information organized by funding sources, by departments, or by expenditure categories are examples of data warehouse applications. The data warehouse may represent the total institutional database or may contain a subset (data mart) designed for use by a specific functional area. The value of the data warehouse is directly related to the availability and use of query tools. (See query languages.)

Distributed Computing Environment (DCE)

The Open Software Foundation (OSF), a consortium of major hardware and software vendors, has recognized the value of building distributed computing environments on open standards and, toward this end, has established the Distributed Computing Environment (DCE). DCE technology is a collection of middleware services or "enabling technology" that can aid the deployment of heterogeneous, networked applications by providing for interoperability across heterogeneous systems. Included are such services as network security, user identification, authentication, and authorization; file services; and a common operating environment that allows institutions to share applications. According to the OSF, DCE is not intended to exist alone, but instead should be bundled into a vendor's operating system offering, or integrated in by a third-party vendor. DCE's security and distributed file system, for example, can completely replace current, non-network analogs. DCE is not an application, but is used to build applications or support purchased applications.

Distributed systems

Distributed systems are emerging as a result of the steep reduction in processor prices and the increased computing capability of these systems. Traditional mainframe, or centralized, approaches are being superseded by the "servers" that provide more power for less money than many traditional systems. Distributed systems can also have the connotation of "user" systems where the applications and processes are under the control of the user departments. This may or may not reflect the physical location of the servers. In many instances, the servers are centrally located, in the existing operations center, to provide consistency of services and system backups.

Document imaging technology

Document imaging technology addresses the increasing concerns of institutions for the storage and retrieval of large databases that are often stored and retrieved as physical paper documents. High-speed document scanning equipment and the availability of high-speed processing and large optical storage databases have provided significant potential for storage and retrieval over previous paper files or microfilming techniques. Databases are usually stored on servers. Advances in programming languages and search techniques provide faster and more efficient procedures for the capture and retrieval of stored data.

Enterprise data

Data that span the institution — that is, data collected and used in support of the mission of the "enterprise" — are often referred to as enterprise data. Examples include data in the campus general ledger, payroll system, human resource management systems, student information system, and purchasing system. Departments that capture enterprise data, taking responsibility for their accuracy and protection, are often called "data stewards," while the institution is considered to be the owner of such data.

Financial standard-setting bodies

The phrase "generally accepted accounting principles" (GAAP) is a technical accounting term that encompasses the conventions, rules, and procedures necessary to define accepted accounting practice at a particular time. Several bodies are involved in setting standards for financial accounting practice. The Financial Accounting Foundation (FAF) was incorporated to operate exclusively for charitable, educational, scientific, and literary purposes under Section 501(c)(3) of the Internal Revenue Code. It has oversight responsibility for the Financial Accounting Standards Board (FASB), Financial Accounting Standards Advisory Council (FASAC), Governmental Accounting Standards Board (GASB), and Governmental Accounting Standard Advisory Council (GASAC); selects members of both boards and both advisory councils; and provides funds for the boards. The FASB was formed in 1973 to establish standards of financial accounting and reporting for all entities other than state and local governmental entities, including private higher education institutions. The GASB was formed in 1984 to establish standards of financial accounting and reporting for all state and local governmental entities, including public higher education institutions. The Cost Accounting Standards Board (CASB) is the federal regulatory body charged with developing cost allocation procedures for all federal contracts.

Information architecture

The way the components of an institution's information resources fit together – the design, planning, control, funding, and exploitation of those resources – can be described as an information architecture. The term encompasses both the information itself and related aspects, such as the structure of how components of information relate to each other. Most information architectures include an enterprise-wide data model to help the institution understand what data are needed and how they map against institutional processes so that those processes can be supported by appropriate data.

Information managers are responsible for the coordination and integration of a wide range of information-handling activities within the organization. These include the formulation of corporate information policy, plans, standards, and design; evaluation and integration of effective information systems and services; the exploitation of information resources for competitive advantage; and the integration of internal and external information and data.

Information technology architecture

Information technology architecture describes the design, planning, control, funding, and exploitation of the investment in technology infrastructure. Over time, this architecture reflects advances in technology implemented by the institution and provides a model from which standards and products can be derived. Plans for use of these new technologies can be documented in a strategic planning document that identifies technologies to be used, policies and procedures for deployment, and the time frames within which these changes will occur.

The technology infrastructure is the set of hardware, software, communications, cable, and personnel that provides, maintains, and supports access to information, processing of transactions, and the standards for security and procedures related to information technology. Typical infrastructure includes mainframe and server hardware and operating systems, applications software, campus network backbone and associated equipment, telecommunications equipment, and desktop computers and terminals. Infrastructure services include the design, development, and implementation of systems; end-user support and help desk facilities; and central operations services.

As institutions migrate from central to distributed processing systems, the information technology architecture is modified to identify the responsibilities of the central or core institutional areas and the responsibilities within distributed areas such as colleges, divisions, and/or departments. The information technology architecture consolidates the institution's investments in technology. Standards established by the central group identify the roles and responsibilities of the distributed computing areas for access, data processing, operations, security, support, and other roles usually associated with a central group. With increased external access via the Internet (especially the World Wide Web platform), the technology interface between these functional areas is focusing more attention on security against external access or hacking.

Integrated databases

Integrated databases support the increased emphasis on access to "enterprise" data, which includes all mission-critical information within the institution. Access includes the ability to extract and produce reports as well as interact in real time with the data using query languages to produce relevant decision support information.

There has been significant progress towards integrated databases through advances in database technology, open systems architecture, and vendor development of applications that integrate data used across applications such as payroll and student information systems. These systems typically contain demographic and financial information on faculty and students that has been difficult to bring together without an integrated database.

The data do not need to reside in a single, physical location. However, the integrated database does need to be able to understand the relationships between files and data elements wherever they physically exist, and does need to eliminate, or reduce, duplicated or redundant data such as names and addresses and account balances. Duplicate or redundant data often imply duplicated data entry, which increases the opportunity for discrepancies to exist between data in different files.

Integration of software applications based on advanced database technology is a key concept. Most markets for new information technology are making integrated solutions a top priority, and vendors are responding to this demand. Some institutions are adopting a "best of breed" strategy of purchasing separate software modules from several different vendors, which makes integration of applications a necessary strategy. Most vendors are designing software so that their applications integrate easily with other vendor products. The choice of underlying database in a commercial product is important because it often limits the software that can be integrated with the financial applications.

Integrated databases can be created from the separate application databases from which they derive — for example, by employing "design around" strategies. This means that the application processes are updating the primary database and periodically the data are integrated in a separate process that allows enterprise-wide data to be available using a different database "engine." So, proprietary operating systems with their own database supporting legacy systems can be accessed to create an integrated set of data that can be used at the enterprise level. This is not necessarily an overhead, since the total processing time for transactions and data integration, depending on the size of the database, may be less with the design-around strategy and save large investments in the redesign of applications. At best, the design-around approach provides time for more meaningful reengineering of business processes without the immediate commitment to the technological solution.

Legacy systems

Usually, but not always, this term is used to describe applications developed using proprietary operating systems and that will only run on the hardware of the owners of the proprietary operating system. IBM's MVS and Digital Equipment Corporation's VMS are examples of proprietary software that restrict hardware platforms of applications. This term may also be used to describe existing, installed systems which typically, but not always, run on proprietary systems.

Life-cycle budgeting/costing

This concept developed originally in the architecture and engineering disciplines to embody the total capital and operating costs of an investment in plant over a planned span of use. Life-cycle costing is particularly important in the context of technology acquisition and/or development activities owing to the relatively short life span of much hardware and software. A frequent and key "land mine" in many technology development projects is the failure of the project team and steering group to look beyond the basic purchase (or development) cost of hardware and software. In a life-cycle costing environment, these costs would be assessed, as would the ongoing costs of supporting the technical environment, including: hardware and network utilization costs; software acquisition, development, licensing, and maintenance costs; and training, help-desk, and other support costs. Increasingly, utility costs can play a major role in life-cycle costs of major information systems. In particular, thorough life-cycle costing exercises are critical where host-based systems are to be replaced with client/server systems. Planners must also account for the "opportunity costs" associated with reducing the utilization of the campus host computer in cases where hardware leases or purchases make it difficult or costly to downsize this hardware.

Middleware

Middleware refers to the software that mediates between an application program and a network. It manages the interaction between disparate applications across the heterogeneous computing platforms. (See Distributed Computing Environment.)

Networked environment

Many systems developments are taking place within networked environments. The networks tie together the central (proprietary or open) systems with distributed processing servers and user workstations through a campus backbone of cable. In a higher education environment, these networks often serve student workstations in the labs from servers located in central or distributed environments. Networks underscore the critical issues related to expanded access to information for faculty, staff, and students with a need to know. In the traditional data processing environment, information was considered to be departmental, and access was restricted to very few people. With the increased recognition of the knowledge worker and the need to share information, the focus is on expanding access to many more people. As the tools for the remote office continue to develop, access from off-campus locations will continue to grow, via standard telephone communications or other more effective means.

Object-oriented programming and design

The basic concept in this approach is that of an "object" which is a data structure (abstract data type) encapsulated with a set of routines, called "methods," that operate on the data. Operations on the data can only be performed via these methods, which are common to all objects that are instances of a particular "class." Thus the interface to objects is well defined, and allows the code implementing the methods to be changed so long as the interface remains the same. Object-oriented design is one of the stages of object-oriented programming. It is a method in which a system is modeled as a collection of cooperating objects, and individual objects are treated as instances of a class within a class hierarchy.

Open systems

These are systems that are built around open operating systems that are supported on multiple-vendor platforms. UNIX is the primary example of this technology. Although it may come in many flavors, such as IBM's AIX or Digital's VX, the basic operating system is supported on various hardware platforms. Several software vendors in the education arena provide applications software that is supported on various vendor platforms – IBM, Digital, Hewlett-Packard, Sun, and so forth. In this case, the application vendors take care of any idiosyncrasies in the various flavors of the UNIX operating system.

Performance measurements

Performance measurements are a set of qualitative and quantitative metrics that identify key indicators (critical success factors) on which a system will be judged and selected. Performance criteria reflect the business and technical requirements and can include the application functionality required, the speed and response time of the system, the technology base preferred, and the support, training, and implementation needs of the institution. The ability to reach an objective judgment will be enhanced by documented selection criteria that focus on key areas and identify the relative priority of the various criteria.

Query languages

Query languages are the tools that allow users to access meaningful sets of data in an interactive manner, independent of predefined reports produced by standard operations processes. As the importance of the information database becomes more critical to the success of the enterprise, so does the capability of a query language to locate, extract, and combine data into meaningful information for decision-making or avoidance of risk. Query languages typically are developed for a specific database, and the efficiency of the database engine and the query language need to be considered together.

Relational databases

A relational database is a database based on the relational model developed by E.F. Codd. A relational database allows the definition of data structures, storage and retrieval operations, and integrity constraints. In such a database, the data and relations between them are organized in tables. A table is a collection of records, and each record in a table contains the same fields.

Certain fields may be designated as keys, which means that searches for specific values of that field will use indexing to speed them up. Records in different tables may be linked if they have the same value in one particular field in each table. Oracle and Sybase are well-known examples of relational databases products.

Responsibility center management

This resource allocation and financial accountability model has gained currency in several major U.S. research universities in the past 15 years. In this model, a university school, college, or major business unit is designated a responsibility center and is responsible for meeting negotiated net revenue objectives. Revenue is recognized from all sources such as direct and indirect sponsored research revenues, gifts and endowment income, and tuition and fees. Many universities using responsibility center management allocate the full costs of operations to the centers, including costs for space utilization, utilities, and even land. The theory of responsibility center management is that focusing the attention of revenue center managers (deans, directors) on net revenues creates behaviors that are both revenue-seeking and efficiency-seeking in cases where centers that generate surplus net revenues are allowed to retain the surplus. Deans, directors, and other revenue center managers who generate surplus net revenues are able, thus, to finance program growth. In units where revenues are insufficient to meet program costs, campus subventions and subsidies are made explicit. Such accounting makes it possible for campus leaders to make informed decisions about the economics of different academic programs and to grow or shrink such programs accordingly, in concert with other (non-economic) campus objectives.

Security systems and backup

Security systems and backup provide a set of standards, policies, and procedures designed to protect and restore the information assets of the institution and include appropriate physical control and security access of the hardware, software, databases, and processes, and the recovery procedures for partial or complete loss of these resources. Continuous availability and security of information, appropriate and timely backups, and disaster recovery plans need to be an integral part of the design, implementation, and maintenance of an information system.

In a central mainframe environment where the computers, programs, data files, and processes are centrally maintained, policies and procedures ensure recovery for various conditions ranging from the need to restore a file to more significant disaster situations.

In the networked environment, security systems and back up become much more complex. In a distributed computing environment, programs, data file updates, and application processes may be occurring anywhere on the physical network. There are dependencies on connections, cables, and intermediary servers to process transactions or respond to requests for information.

Increased access to integrated databases requires processes and procedures to ensure authorized access to information. Access to the network can take place anywhere, depending upon the capabilities of the network and communications systems. So security systems need to be designed into layers that allow validated access to the network and continuing validation of a person's right to navigate and access the information system. As the access to information becomes more important, so too does the ability to access the data on a 24-hour basis.

Shadow systems

Shadow systems are locally developed systems that duplicate and/or improve on functions or activities supported by core institutional information systems. Because many core systems are old, use antiquated and unfriendly technology, and were not designed to support analysis and ad hoc reporting, and as campus desktop computing environments have matured, many departmental personnel who depend on financial information have deployed sophisticated systems to provide departmental accounting and other services. These systems can essentially represent duplicate accounting books. While these systems go far in meeting local needs for information and function, they often generate substantial redundant workload and create often-significant data integrity and quality problems resulting in complicated month-end and year-end reconciliations with the institution's "book of record." Financial information systems that meet the needs of the most particular and sophisticated users of such information — often the auxiliaries — reduce the incentives to develop and support shadow systems.

Smart-card technology

A smart card refers to any plastic card (like a credit card) with an embedded integrated circuit for storing information. Smart cards are being incorporated into soldiers' dog-tags and used to store hospital patients' medical records. They are also being used as student/faculty/staff campus ID cards that can contain information on that individual. Other uses are as a form of token in a financial system; for example, the system can store on the card electronic money or credits towards campus food services. Some campuses are beginning to use these cards to store personnel information or for security access.

World Wide Web

The World Wide Web (WWW) refers to the universe of hypertext servers (HTTP servers) that allow text, graphics, sound files, etc. to be mixed together and accessed via the Internet. The Web often points to the whole constellation of resources that can be accessed using tools such as Gopher, FTP, HTTP, Telnet, and Usenet. Many colleges and universities are beginning to use the Web as a front end (or interface) to their administrative systems, especially for students to access their information in legacy systems. Many institutions also use the Web for institutional forms, replacing traditional paper forms. For some institutions, using a Web platform is a good strategy for migrating legacy systems into a networked environment.

Some descriptions in this glossary were adapted from definitions found in *The Free On-line Dictionary of Computing* (http://wombat.doc.ic.ac.uk/foldoc/contents.html).

Appendix C: Components of a Traditional RFP

Section I - General Information

Introduction

The introduction should state the basic objectives of the RFP (as identified on page 63), identify the confidential nature of the RFP as a valuable document of the institution containing information pertinent to its operations, and provide an overview of the remaining sections to orient prospective suppliers.

Schedule of Key Events

This subsection highlights major activities associated with the issue of the RFP: proposal dates, site visits or demonstrations, contract awards, and implementation objectives. This provides valuable information for suppliers in responding to the schedule and resource requirements of the bid. Schedules will obviously be subject to change at the discretion of the institution.

Response Terms and Conditions

This subsection provides information to suppliers to identify the formal procedure surrounding the RFP process. It may include how vendors should provide notice of intent to bid, the date and location for delivery of proposals, and the process of requesting clarification on any item included in the RFP. This allows the institution to control the process internally by providing defined contacts for the suppliers. This process may include identifying that the requests for clarification and the subsequent response will be copied to all suppliers, thus keeping them all apprised of information.

This subsection may also provide some basic definitions that will protect the institution:

- Rules for bidders' conferences
- Right to amend or supplement the information
- Hold-harmless clauses
- Evaluation period
- Price changes
- Assignment or subcontracting
- Payment schedule
- Insurance
- Award of contract (official approval process and notification)
- News releases and confidentiality

To some extent these may be considered as "boiler plate" items that can be lifted from standard contracts. The institution's legal counsel should review these to ensure the institution is not at risk.

Vendor Eligibility and Selection Criteria

This subsection is designed to allow the institution to eliminate potential suppliers who do not meet specific requirements of the project and/or to allow a potential supplier to decide not to bid. This is extremely valuable to the selection team since it can significantly reduce the number of alternatives that need to be taken into consideration throughout the process.

The information will outline the institution's expectations, which may be related to the supplier's experience in the marketplace, installations at comparable sites (for example, community colleges or research universities), installations at sites with comparable volumes (number of students, faculty, total staff, general ledger accounts), availability of systems that integrate, as an example, student information systems and financial information systems, and systems with specific technical architecture (e.g., client/server technology or rapid application development tools). These kinds of criteria will obviously vary from institution to institution, and can be identified as "knock out" criteria. This concept, which tends to facilitate the progress of the evaluation team, was discussed on page 60.

The eligibility criteria may focus on primary eligibility criteria and general evaluation criteria. The primary eligibility criteria tend to be highly visible items that will become quickly apparent and tend to eliminate alternatives at an early stage. The general evaluation criteria identify items that will probably be evaluated as part of the proposal and evaluation process. It would include items such as overall ability to meet requirements, supplier's financial health and stability, ability to meet data conversion needs, compliance with standard audit control procedures, quality of site visits, and characteristics of proposed hardware and software. The presentation of these criteria in this subsection will tend to make potential suppliers think through the process and determine if they want to bid on the project.

Section II - The Institution and Information Technology

The purpose of this section is to indicate to suppliers the importance of an effective ongoing relationship with the institution in achieving its information technology goals and objectives. These characteristics can involve short-term and long-term objectives and indicate the need for the supplier to be in a continual development mode with its products and services.

Overview of the Institution

This subsection provides historical and environmental data about the institution to the suppliers. The information could include the mission of the institution, the governance, size and location, initiatives that are indicative of the institution's administrative and academic directions and challenges, and an organization chart of the major areas of the institution.

Strategic Direction of Technology

This subsection is tailored to the strategic vision of the institution and points out to the supplier the information that the institution believes is important to allow the supplier to share and participate in that vision. It will provide information to support the strategic statements in the steering committee's strategic directions report.

Typical of the content of this section would be:

- The mission-critical nature of excellence in information systems and technologies.
- Strategies related to the internal system development philosophy of the institution. This will indicate to suppliers the role that the in-house resources of the institution may play in the project. This information will provide insight into the extent to which the institution is looking at buy, build, or partner solutions.
- The strategy surrounding the transition to a new financial information system, including a description of the technology infrastructure to support the business process required by the institution, the transaction processing orientation of the system, and the institution's need for supplier support resources for technical and user staff in the planning, project management, training, testing, and installation of the required business applications. The information may also indicate the needed supplier support for the conversion of databases and the skill development of the institution's technical and user staff. This area is obviously projecting into the implementation and identifying the levels of support, training, and documentation that will be expected from the supplier.
- The future technology direction of the institution. This will be described to indicate that the institution needs to have ongoing enhancement to the system. These areas could include the kinds of future technology described in the technology evaluation discussion and would emphasize those areas related to access, graphical user interfaces, decision support systems, client/server architecture, and other areas of new technology which the institution wishes to pursue.
- Strategic issues related to cost/benefit considerations where the institution will describe its focus on cost/benefit issues and the added value of new and enhanced system. This discussion can include insight into the institution's concept of partnering with the supplier using internal staff to encourage new development and maintain costs. The supplier's input on improved productivity of existing staff resources can also be covered in this area.

Description of existing technological environment

This subsection provides suppliers with information on the existing technology environment of the institution. This could include such information as:

Existing administrative computing services — purpose of the department, organization, staffing, and location. The capability of the existing staff to deal with issues contained in the strategic section and in current projects and workload can be identified.

Existing application systems — description of the major applications currently in production, basic modules of each application, and any specific functions that may not be standard in the industry, including leading-edge technologies already in operation.

Existing hardware and software systems — a detailed description of production and development hardware and operating software, number of workstations, terminals, printers, and other devices in the central environment, including:

- major operating software, programming languages, and report generation capability;

- networking capabilities (including network applications), servers, and types of wiring and communications cabling;
- user department workstations, terminals, and printers, including distributed applications if applicable; and
- other technology information that may be useful to the supplier in responding to the short-term and long-term needs of the institution.

Section III - Business Process Requirements

This section describes the application requirements of the institution. These requirements can be presented in subsections that cover General Application Requirements and Specific Application Requirements.

General Application Requirements

This subsection describes the function and feature requirements that are common to all the application software modules as well as those system-level functions that will be used by the user community.

These requirements describe key features that are deemed to be critical to the institution's user community. They tend to indicate the infrastructure of applications and common threads upon which the system should operate. To some extent, this information will indicate the extent to which application modules are integrated into a comprehensive business system.

In general, this subsection allows the business process and technology teams to identify what they consider to be critical items without repeating the items in each specific application requirement. These issues will normally be generated as a result of developing requirements and participating in consciousness-raising activities with various suppliers and other institutions. While the issues will be tailored by the individual institution, the following may give some indications on the content of this subsection:

- Outside agencies that have validated one or more parts of the system for accuracy and consistency with industry standards
- Maintenance agreements
- Support plan for customers
- Indicators of an integrated system — common database and nonduplicated data elements, security, screens, automatic updating of financial records from student registration or payroll transactions
- Optional features that may be turned on and off and which may affect performance
- Backup, recovery, and transaction-logging features
- Documentation/online documentation available to users
- Ability to navigate between applications without lengthy sign-on procedures
- Support for network facilities such as uploading and downloading of files to and from workstations
- Archiving and retrieval of archived data
- Remote printing capability/report generation capabilities
- Support for future applications not described in the Specific Application Requirements: inventory management, smart card, Internet/Web access, equipment tracking, facilities management
- Customization performed for and by other customers that could be available

Specific Application Requirements

This subsection describes the function and feature requirements of the user community for all specific applications. This is the section that the suppliers may be required to copy, complete, and return to the institution; it is the most specific, detailed section of the RFP.

This subsection results from documentation on the features and functions, which may be classified as essential or desirable. This indicates to the supplier the relative importance of each line item. The scoring on these items may allow the supplier to respond in different ways to the line items. One technique that can be used in an RFP allows for the following responses by suppliers:

A. Feature or function currently exists and can be demonstrated
B. Feature or function exists, but must be modified prior to implementation to meet specific requirements
C. Not currently available, but will be provided prior to implementation at no extra charge
D. Not currently available, but will be provided prior to scheduled implementation at an additional cost identified in the cost section
E. Feature or function not included in proposal

The responses in this format will quickly identify the "gap" between customer expectation and supplier product capability. The gap list can be used to identify potential custom development, internal development, or partnering strategies.

In the typical financial information system document, a sample Specific Application sheet could appear as shown on the following page. The major point of this or other methods of presenting requirements is to provide a detailed list of business application requirements while providing flexibility between essential and desirable as

General Ledger System

1. The system should support multiple agencies A B C D [E]
2. Ability to accommodate different fiscal years for different accounts A B C D [E]
3. Automatically summarize inter-fund debit and credit transactions to a summary transaction when the debit and credit transactions occur within the same account A B C D [E]
4. Ability to initiate budget transfers online A B C [D] E

well as flexibility in the suppliers' responses. This section is a comprehensive section since it will contain all the detail on all the business processes covered by the project.

Section IV - Other Requirements

This section describes the technical requirements and requests specific information (which will include cost information) in technical and support areas.

Implementation and Support Requirements

This subsection describes requirements for supplier deliverables for implementation of the proposed system and would include items such as the following:

- Detailed implementation work plan and progress reporting system
- Overall direction for software loading and file conversions
- Establishment of production and test systems
- Provision of formal training on each module for users consistent with the implementation schedule
- On-site assistance and telephone assistance
- Post-implementation support to fine tune the system

System Level Software and Technical Requirements

This subsection requests information on a variety of topics related to implementation and the overall system capability:

- System security — covers security levels, password implementation and maintenance, special features for standard profiles, handling of unauthorized attempts to access the system, levels of security
- Database management — describes data access methods, tools and report generators available, any file or data limits, maintenance requirements, and database recovery capabilities
- Query/report writer — requests information on formatting, data access, real-time report generation from the database, ability to project query run times, ability to extract and download, user friendliness
- Application development tools — identifies functions, features, benefits, and training requirements of available software development tools
- Connectivity — describes support for one or more network communication disciplines, remote terminals, and printers
- Teleprocessing, operating systems, and system utilities required for production operations — includes job scheduling, peripheral management system

Hardware Requirements

This subsection requests specific information on hardware proposals. The focus in this section is to ensure the capacity of the system and the performance of the system. The information provided in various sections of the RFP has identified the volume of transactions across applications, the number of users, and the configuration of terminals and workstations. The supplier needs to respond with a hardware configuration that will support these stated volumes. This subsection will also address some of the more pragmatic production operation issues in terms of print volume, magnetic tape backup and recovery capability, and the ability to monitor performance and fine tune the system.

Section V - Proposal Format and Instructions

This section is designed to manage the response to the RFP and provide specific instructions on how suppliers need to respond, including any standard forms to be used. The sequence of this section mirrors the layout of the RFP.

Outline of Proposal Format

This subsection outlines the format and can include:

Notice of intent to bid

- Cover letter
- Supplier statement of ability to meet primary eligibility criteria
- Supplier financial data

Proposed solution

- Table of contents
- Transmittal letter
- Total system solution
- Supplier qualifications
- Application software requirements
- System-level software and technical requirements
- Hardware requirements
- Proposed implementation schedule and level of effort
- Any additional information
- Exceptions to the RFP (supplier identifies specific areas where they are unable to meet one or more areas of the RFP)
- Sample contracts

Cost proposal

This is a separate section that allows the supplier to provide the cost information separate from the system proposal information.

Sample documentation

This could include samples of supplier documentation for users, operators, data entry, technical staff, plus any additional material that will identify the availability and quality of the documentation.

Description of Proposal Sections

This subsection provides detailed information on each of the steps summarized in the outline above.

Standard Forms for Responses

This subsection provides standard forms that will provide a consistent method for all suppliers' responses, and makes comparison more straightforward. Forms included in the package should reflect the content of the RFP, so that suppliers can be led through the responses to each section. Separate forms can be provided for the suppliers to identify cost information so that the functional responses can be reviewed and evaluated separately from the cost information. If required, forms for purchase options and lease options can be provided.

Appendices

Information that will assist the supplier in further understanding of the institution can be included in appendices.

Appendix D:
Sample Vendor Evaluation Criteria

Sample General Vendor Review Criteria

Background/History

- Who started the company, when, and why?
- What were the initial products?
- Who were the initial clients?
- Describe growth in products, staff, and so forth.
- What have been the changes in focus and client base?
- What are the significant accomplishments?

Vision/Core Values

- What is the vision of the company?
- What are the core principles, i.e., the three to six statements that define the company, that will stay the same regardless of internal and external change?

Company Financial Position

- Is the company publicly or privately held? Is information available to the public?
- Does the company voluntarily disclose debt structure, financial projections, and planning?

Products and Services

- What are the key products, basic architecture, hardware platforms, languages?
- What is the product orientation – i.e., toward what computing environment, solving what business problems?
- What are the types of products – extent of customization vs. turnkey installation?
- Is there an overview of the development process, testing and evaluation procedures, release schedule?
- Are projects always or usually completed on time?
- Are deadlines met?
- How are budgets established?
- What are the life cycles of products?
- Is the market niche(s) changing?
- What are the projections?
- How is the need for upgrades, new products assessed?

Facilities and Staff

- Describe status and security of facilities.
- Are there any plans for new facilities?
- How many original employees were there?
- How many of the originals remain?
- Describe the ideal employee.
- Describe the typical employee, e.g., education, experience, etc.
- How are employees hired?
- What is the rate of staff turnover?
- Describe the general morale of the employees.
- Are open positions filled relatively quickly?
- Is there competitive compensation?
- Describe employee benefits.
- Describe staff training, cross training.
- Describe employee evaluation.
- Who is promoted and why?
- Who are the leaders in the company?
- What is the functional expertise of the staff?
- Do staff skills match client needs?

Policies and Procedures

- What are the written procedures for product development?
- Are products always developed the same way?
- How are problems tracked?
- What are the legal procedures and policies, e.g., contracting standards?
- Are there any extant legal complications?

Organization and External Relationships

- Are formal organization charts available and up to date?
- Describe staff coordination, communication.
- What are policies and traditions on ethics, security, integrity?
- What is the management style?
- What are the user groups?
- What are the advisory groups?
- How are user expectations and satisfaction surveyed, assessed, and/or measured?

Innovation and Planning

- How are good ideas encouraged, recognized, evaluated, incorporated?
- Is there any formal planning and plans (e.g., operational, multi-year, disaster)?
- For project planning with goals, objectives, deliverables, budgets, responsibilities, staffing levels, and deadlines — how are changes to these plans accommodated (change order process)?
- How does the client participate in planning?

Self-assessment and Quality Control

- How is quality assured?
- How is customer/client satisfaction measured?
- What is the method of self-assessment/benchmarking with management, employees, clients?
- Is there credibility with clients, competitors, the professional community?
- Who are major competitors, and how is competition monitored?

Sample Financial Module Review Criteria

The following questions might be asked specifically about the supplier's financial module:

- What are the product specifications, development history, and present status of the financial module?
- What is the number of modules?
- How are user interfaces developed?
- What are the existing architecture, hardware platforms, databases, and software development tools?
- What are future plans for the product's architecture, hardware platforms, databases, and software development tools?
- Are there plans to move to an open environment? client/server architectures? UNIX-based products? Are products compliant with the Open Software Foundation's Distributed Computing Environment (DCE)?
- What is the accounting structure?
- Does the module take advantage of relational database tabular structure?
- Is it integrated, stand-alone, or other?
- What are the software report capabilities? Do they leverage database capabilities?
- Are there adequate code documentation and user documentation?
- How are user control requirements met?
- Who is an ideal or typical customer?
- Has the client base changed, and are changes in the target market anticipated?
- How much product customization occurs?
- Is code being changed for any reason?
- What new functionality has come into the product, e.g., is an object-oriented approach anticipated, have graphical user interfaces been developed?
- Is there technical support for customers, help lines, user group meetings, and so forth?
- Are there team arrangements with hardware vendors? with customers?
- How do staff acquire new functional expertise when required?

Sample Evaluation and Partnership Criteria, California Lutheran University

The criteria below were used by California Lutheran University in evaluating the vendors who submitted proposals to partner with CLU in a network project, but they could apply in a systems project, as well. Vendors were provided a description of the specific issues that had to be addressed in their presentation, the benefits CLU planned to provide as a partner, CLU's vested interest in the partnership, and a copy of the actual evaluation process steps.

Evaluation Criteria

Strategic Partnership

Conformance to CLU's Mission:

1. Has the vendor developed a preliminary plan or a list of potential partnership-related activities (i.e. participating with CLU in trade shows and academic conferences, teaming with CLU in innovative joint marketing ventures, providing grant contacts, etc.) that could help achieve CLU's mission through the partnership?

2. Has the vendor committed to implementing the plan or participating in activities that will support CLU's mission?

3. Are either parts of the plan or some of the proposed activities outside the boundaries of CLU resources, capabilities, preferred lines of business, or organizational culture? If yes, does this severely damage the feasibility of the proposed plan or set of activities?

Conformance to the Vendor's Mission:

1. Has the vendor clearly stated its corporate mission?

2. Does a partnership as CLU perceives it effectively support the vendor's mission? If not, this is a potential risk that must be managed and mitigated.

3. Has the vendor developed a preliminary plan or a list of potential partnership-related activities that could help them achieve their mission through the partnership? If the plan or the list of activities do not convince you that there is a strong correlation between the vendor's mission and a CLU partnership, this is a potential risk that must be managed and mitigated.

4. Are either parts of the plan or the proposed activities outside the boundaries of CLU resources, capabilities, preferred lines of business, or organizational culture? If yes, does this severely damage the feasibility of the proposed plan or set of activities?

Practical Partnership

1. Are the vendor's vested interests clearly identified?

2. Are these vested interests consistent with the vendor's mission statements? If not, this is a potential risk that must be managed and mitigated.

3. Are the vendor's vested interests in conflict with CLU's vested interest or business practices?

4. Has the vendor acknowledged CLU's vested interest and made a commitment to serve that vested interest?

5. Have each partner's responsibilities and expectations been *very specifically defined* to ensure a mutual understanding and agreement to the proposed responsibilities and expectations?

Economic Partnership

1. Are the financial strategies feasible within CLU's financial capabilities?

2. Are any of the financial strategies outside the boundaries of CLU business philosophy or practices? If yes, does this severely damage the feasibility of the entire financial strategy?

3. Are the financial strategies based upon realistic financial projections and data?

4. Are the explanations of the financial strategies, the data that support these strategies, and the revenue-sharing strategies clear, concise, and not open to multiple interpretations or in need of clarification?

5. Are the revenue-sharing strategies equitable to both CLU and the vendor?

6. Does the financial strategy provide for a technical and service solution that strongly supports CLU's mission statements and [project] mission statements?

7. Does the financial strategy strongly support achieving the vendor's mission statements? If not, this is a potential risk that must be managed and mitigated.

Partnership Criteria

Strategic Partnership

Conformance to CLU's Vision:

A commitment to work within CLU's resources and capabilities to establish a partnership and develop a plan that will directly support CLU's strategic vision, which includes:

- Earning distinction in the learned professions.
- Achieving rank as an institution of first choice of students regionally and beyond.
- Equipping students for meaningful lives and successful careers in the context of technological, ideological, and social change.
- Providing for the professional, economic, cultural, and social welfare of the communities in Southern California and beyond.
- Growing into an institution of 2,200 undergraduate and 1,200 graduate students.

Conformance to the Vendor's Vision:

A commitment to work within CLU's resources and capabilities to establish a partnership and develop a plan that will directly support the vendor's strategic vision (as defined by the vendor) which could include:

- Entering or solidifying its position in the market.
- Gaining or maintaining a significant competitive advantage in the market.
- Meeting its long-term strategic goals (i.e. sales, growth etc.).
- Enhancing the vendor's image in the community by demonstrating social responsibility.
- Gaining regional visibility.
- Gaining increasing exposure and credibility in the marketplace.

Economic Partnership

A commitment to work within CLU's resources and capabilities to establish a partnership which develops innovative financing strategies that support CLU's goals within CLU's budget while ensuring sought-after tangible and intangible benefits to the vendor by:

- Graduated scales constraints of payments to meet CLU's budget constraints.
- Expanding vendor opportunities as CLU grows.
- Participating in mutual R & D of new opportunities.
- Sharing with the vendor additional CLU revenue resulting from capabilities provided by vendor through innovative financing strategies and joint CLU/vendor marketing ventures.
- Sharing with CLU additional vendor revenues resulting from joint CLU/vendor marketing ventures.
- Developing realistic financial projections.
- Ensuring an acceptable return on investment for each partner.
- Improving CLU's grant positioning by helping establish a track record of providing students with sought-after capabilities and services cost-effectively.

Practical Partnership

A commitment to work with CLU to establish an honest and open relationship that:

- Openly recognizes and supports each partner's vested interest.
- Specifically details each partner's responsibilities and expectations.

Appendix E: Sample Measurement Systems

The two approaches included in this appendix are provided simply as examples of measurement methods that have been used successfully in systems projects. Neither may be appropriate for your systems project.

Model Used by Sinclair Community College*

Phase I - Application Requirements - Total of 65%:

Financial Management - 60% = to (.65x.60) 39% of Phase I

General Ledger	20%
Purchasing/Receiving	15%
Accounts Payable	15%
Budgeting	15%
Decision Support	15%
Central Stores	2%
Bookstore	3%
Fixed Assets	5%

Human Resources/Payroll - 40% = to (.65x.40) 26% of Phase I

Human Resources	45%
Payroll	45%
General Requirements	4%
Training	2%
Documentation	2%
Support	2%
General Requirements	4%
Training	2%
Documentation	2%
Support	2%

Phase I - Technical Requirements - 35%

Hardware - 25% = to (.35x.25) 8.75% of Phase I

Support 200 users	25%
Adequate Performance	25%
Printing	10%
Backup Services	10%
UPS/Line Conditioning	10%
Upgrades	5%
Academic Computing	5%
General Requirements	4%
Training	2%
Documentation	2%
Support	2%
System Security	10%

Software - 75% = to (.35x.75) 26.25 of Phase I

Database Management	30%
Query Report Writer	10%
Development Tools	20%
Development Language	15%
Connectivity	5%
General Requirements	4%
Training	2%
Documentation	2%
Support	2%

***The original of this model included modules for the Student Information System and the Alumni/Development System.**

Phase II Evaluation

Implementation

- * Implementation Plan
- References
- Ability to Complete
- Financial Stability
- Comfort Level

Costs

- Application Software
- Hardware
- Systems Software
- Other Costs:
  - Custom software
  - Partnership costs
  - Special or temporary staffing
  - Conversion programming
  - Keying or other support
  - Training and documentation
  - Hardware or software maintenence for two systems during conversion
  - Changes to infrastructure (cabling, etc.)
  - Project contingency

* The implementation plan includes overall evaluation of training, implementation, documentation, and support in addition to individual evaluations of the implementation plan provided by specific application and technical groups.

An alternative model for defining measures

Vendor Firm Analysis
(worth 10 percent of total evaluation)

4% References (telephone questionnaire)
2% Client base
2% Firm's financial stability (both current and five-year trend)
1% Experience
1% Employee profile

Applications Software Technical Analysis
(worth 30 percent of total evaluation)

5% Applications software standards
4% Database standards
4% Documentation
4% Security and access control
4% Training
3% Compatibility and general technologies
3% Continuing support
3% Installation services

Applications Software Functional Analysis
(worth 60 percent of total evaluation)

Financial Management Systems
19% General ledger
9% Accounts payable
9% Accounts receivable
9% Available funds
9% Budgets
9% Grants and contracts accounting/sponsored program tracking
9% Loan administration
9% Property control
9% Purchasing
9% Student accounts

Human Resources
50% Payroll
50% Personnel

Appendix F: Corporate Products and Services

Listed below are corporate members of NACUBO and CAUSE that have financial application products or consulting services related to financial systems acquisitions and implementations. This is not intended to be an all-encompassing list, that is, it does not include companies with peripheral products related to financial systems (such as financial aid, cashiering, smart cards) or companies with products that would be used in retooling in-house developed systems (such as integration or development tools, database management systems, data warehouse development tools, middleware, and so forth). Your project management team can learn more about most of the corporations and firms listed below, as well as many others with peripheral products, by visiting the CAUSE Corporate Member Directory on the CAUSE World Wide Web server (http://cause-www.colorado.edu/member-dir/cusclass/corporation_members.html).

ABT, Inc.
4631 West Chester Pike
Newtown Square, PA 19073
phone: 800-220-2281
fax: 610-359-1351
http://www.abtcampus.com/

American Management Systems
4050 Legato Road
Fairfax, Virginia
phone: 703-267-8147
fax: 703-267-2196
http://www.amsinc.com/

Andersen Consulting
45 South Seventh Street
Minneapolis, MN 55402
phone: 612-334-4512
fax: 612-334-4710
http://www.ac.com/

Bi-Tech Software, Inc.
890 Fortress Street
Chico, CA 95973
phone: 916-891-5281
fax: 916-891-4816
http://www.bi-tech.com/

Business Information Technology
1800 Sutter Street, Suite 770
Concord, CA 94520
phone: 510-671-0595
fax: 510-671-2523
http://www.bitcorp.com/bitcorp

Buzzeo, Inc.
Corporate Office
13951 N. Scottsdale Road, Ste. 111A
Scottsdale, AZ 85254
phone: 602-596-2484
fax: 602-596-2486
http://www.buzzeo.com/

Campus America
900 Hill Avenue, Suite 205
Knoxville, TN 37915-2523
phone: 615-523-9506
fax: 615-525-5628
http://www.campus.com/

CARS Information Systems Corporation
Corporate Headquarters
4000 Executive Park Drive
Cincinnati, OH 45241-4009
phone: 513-563-4542
fax: 513-733-8990
http://www.carsinfo.com/

CASEware Technology, Inc.
3149 N. Highway 89, Suite 8
Ogden, Utah 84404
phone: 801-782-0404
fax: 801-782-3317
http://intele.net:80/~caseware/

CMDS, Inc. ✓
1661 Virginia Avenue
Harrisonburg, VA 22801
phone: 800-999-2637
fax: 540-432-5275
http://www.product.com/cmds/

Computer Associates
One Computer Associates Plaza
Islandia, NY 11788-7000
phone: 516-342-5224
fax: 516-342-6864
http://www.cai.com/

Coopers & Lybrand
One Post Office Square
Boston, MA 02109
phone: 617-478-5211
fax: 617-478-5900
http://www.colybrand.com/

✓ This corporation was inadvertently left off the list in the original publication.

Datatel, Inc.
100 Spear Street/Suite 1410
San Francisco, California 94105
phone: 415-957-9000 or
800-969-9002
fax: 703-968-4540
http://www.datatel.com/

Deloitte & Touche LLP
2101 Webster Street, Suite 2000
Oakland, CA 94612
phone: 510-287-2804
fax: 510-273-2310
http://www.dttus.com/

EDUTECH International
120 Mountain Avenue
Bloomfield, Connecticut 06002
phone: 203-242-3356
fax: 860-242-9634

Ernst & Young LLP
1225 Connecticut Avenue, N.W.
Washington, DC 20036
phone: 202-327-6356
fax: 202-327-6227

Gartner Group
56 Top Gallant Road
Stamford, CT 06902
phone: 203-316-1111
fax: 203-975-6576
http://www.gartner.com/

Grant Thornton
1660 Lincoln Street, Suite 2600
Denver, CO 80264
phone: 303-861-5555
fax: 303-894-9620

Hyperion Software
900 Long Ridge Road
Stamford, CT 06902
phone: 203-703-3000
fax: 203-968-9319
http://www.hysoft.com/

IBM
Higher Education
1133 Westchester Avenue
White Plains, NY 10604
phone: 914-642-6035
phone: 914-642-6848
http://ike.engr.washington.edu/

Kaludis Consulting Group
2505 Hillsboro Road, Suite 302
Nashville, TN 37212
phone: 615-297-3880
fax: 615-297-3884

KPMG Peat Marwick
Higher Education Technology
and Operations Practice
P.O. Box 4545
Houston, TX 77210-4545
phone: 713-221-0116
fax: 713-221-0329
http://www.kpmg.com/

Oracle Corporation
222 Berkeley Street, Suite 1200
Boston, MA 02116
phone: 617-437-8369
fax: 617-247-2847
http://www.oracle.com/

PeopleSoft, Inc.
Corporate Headquarters
4440 Rosewood Drive
Pleasanton, California 94588-3031
phone: 510-225-3000
fax: 510-225-3100
info@peoplesoft.com
http://www.peoplesoft.com/

Pinnacle Software Corporation
180 WillowBrook Office Park
Fairport, NY 14450
phone: 716-381-2750
fax: 716-381-5211
http://pinsun1.sctcorp.com/

Price Waterhouse LLP
3110 Fairview Park Drive
Falls Church, VA 22042
phone: 703-641-5522
fax: 703-646-5568

Quodata Corporation
One Union Place
Hartford, CT 06103
phone: 203-728-6777
fax: 203-247-0249
http://www.quodata.com/

SAP America, Inc. ✓
701 Lee Road
USA-Wayne, PA 19087
phone: 800-USA-1SAP
fax: 610-725-4555
http://www.sap.com/

Software AG
11190 Sunrise Valley Drive
Reston, VA 22091
phone: 703-391-6704
fax: 703-391-8290
http://www.sagus.com/

Systems & Computer Technology
Corporation (SCT)
2 Country View Road
Malvern, PA 19355
phone: 610-647-5930
fax: 610-640-5102
http://www.sctcorp.com/

USA Group TRG, Inc.
4343 East Camelback Road
Phoenix, AZ 85018
phone: 602-808-4000
fax: 602-808-4001
http://www.trglink.com/

Virchow Krause & Company
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phone: 612-341-3030
fax: 612-341-9838

✓ This corporation was inadvertently left off the list in the original publication.

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PeopleSoft, Inc., was established in 1987 to provide innovative software solutions that meet the changing business demands of enterprises worldwide. A client/server applications pioneer and market-share leader, PeopleSoft initiated vertical industry focus on higher education in 1994 and supports a complete suite of enterprise applications for financial management, human resource management, and student service administration, including admissions and recruiting, records and registration, degree progress, financial aid management, and student accounting and billing.

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About NACUBO and CAUSE

The leader in addressing higher education's financial and business management issues, NACUBO is a nonprofit organization representing the interests of more than 20,000 constituents at 2,200 higher education institutions. The association promotes sound management and financial administration of colleges and universities through publications, continuing education seminars, information programs, and research, and provides information to members concerning government activities affecting higher education.

Membership benefits include *Business Officer*, a monthly newsmagazine; a membership directory; Special Action Reports; Advisory Reports; Public Policy Alerts; publications; and professional development workshops. NACUBO's Web site, at http://www.nacubo.org/, includes offerings of weekly news from the business officer's perspective, the latest *Federal Register* notices, weekly accounting tutorials, and a resource directory. Workshops offered include Financial Executives Symposium, Financial Information Systems, and Senior Financial Officers Conference.

NACUBO keeps members abreast of the latest trends in higher education financial management through annual studies and research projects such as the Benchmarking Study, the NACUBO Endowment Study, and the Tuition Discounting Survey. The association also plays a significant role in the national accounting standard-setting process.

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CAUSE is the association for managing and using information resources in higher education. CAUSE helps members manage information resources — technology, services, and information — more effectively on campus. Since its incorporation in 1971, CAUSE has grown to an international association with 3,700 members on more than 1,400 college and university campuses.

The association's professional development program includes an annual conference, regional conferences, seminars and workshops, and the CAUSE Management Institute. CAUSE publications such as *CAUSE/EFFECT* journal, professional papers, and newsletters deal with the impact of technology on information resources, from campus management challenges to broad higher education issues. The CAUSE Information Resources Library and the CAUSE Institution Database Service are sources of focused and timely information for members. The CAUSE Web site, at http://cause-www.colorado.edu/, offers electronic access to a wealth of information resources, plus unique services such as the job posting service, an interactive membership directory, current issues pages, and constituent group electronic discussion lists.

CAUSE also works with other organizations on issues of importance to higher education through cooperative studies, task forces, seminars, and publications, especially with Educom and the Association of Research Libraries through the HEIRAlliance and Coalition for Networked Information.

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